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USSR Report

ENERGY

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OIL MINISTRY OFFICIAL ON PLANS FOR GEOPHYSICAL RESEARCH

Moscow NEFTYANOYE KHOZYAYSTVO in Russian No 11, Nov 85 pp 3-8

[Article by N. A. Savostyanov, USSR Ministry of Petroleum Industry: "Petroleum Geophysics in the 12th Five-Year Plan"]

[Text] One of the catalysts of scientific-technical progress in the petroleum extraction sector is petroleum geophysics, which is equipped with up-to-date technical means (highly efficient and precise electronic instruments and regional geophysics processing centers with powerful computers) and supplies information to practically all spheres of activity of the Ministry of Petroleum Industry.

In prospecting for and exploring petroleum deposits geophysical information is the basis for studying the deep structure of the interior with a high degree of detail and preparing sites for subsequent deep exploratory drilling. Modern seismic exploration makes it possible not only to obtain data on the geometry of the earth's interior and the forms of bedding and tectonic disruptions in a layer of sedimentary rock, but also to characterize their material composition, identify reservoirs, and under favorable circumstances support direct prospecting for petroleum and gas deposits.

Geophysical well testing is done to study the geological cross-section, identify productive strata in it, and determine the parameters of oil and gas reservoirs in order to calculate reserves and plan exploitation.

During drilling geophysical well testing data insures monitoring of the spatial position of the hole and technical condition of wells, predicting and studying zones of complexity, and monitoring and regulation of drilling modes. In addition the geophysical service tests wells with pipe-type formation testers, takes samples of rock and saturating liquids from the walls of the well, and does work to open up strata with perforators and to shoot wells.

In oil extraction geophysical methods are used to monitor the exploitation of deposits: profiles of inflow and injectivity are taken, the positions of gas-water-oil contacts are established, and under favorable conditions the current oil saturation of strata is evaluated, zones of gas and water ingress and cross-flows are determined, hydrodynamic listening is done, the static and dynamic levels of liquid in wells are determined, and so on.

Without broad use of geophysical information to solve the key problems of the petroleum industry its continued progress would be inconceivable in the constantly changing conditions of prospecting, exploration, and exploitation of desposits of oil and gas. Therefore, to a significant degree the sector's prospects for development depend on the state and latest achievements in geophysical work.

Scientific-technical progress in geophysical methods of exploration will take the following main directions in the 12th Five-Year Plan.

1. Further development of methods of seismic and industrial-geophysical testing;

2. Development and refinement of geophysical apparatus and equipment;

3. Use of more sophisticated software and more powerful computers to process geophysical data.

To meet the first two challenges further refinement of the technical and methodological levels of field geophysical work is envisioned; this means primarily seismic exploration, which is the basic, most informative, and highest-resolution method of studying the earth's interior (seismic exploration is 92-94 percent of all field geophysical work in the Ministry of Petroleum Industry).

A transition is envisioned to the Progress-96 digital seismic station built at the special design bureau of seismic instrument making in Saratov by the design group headed by B. L. Lerner. This station will permit large-scale field work with 96-channel recording and heightened resolution capacity (a quantization step of 1 meter/second), which will significantly improve the quality and productivity of field seismic exploration. Plans envision use of the STS-1 multichannel seismic recording telesystem developed at the Krasnodar special design-technological bureau of seismic electronic equipment. This fundamentally new recordkeeping system is especially effective in areal and spatial (three-dimensional) seismic exploration. In the 12th Five-Year Plan development of a portable 48 (96)-channel digital seismic station for work in inaccessible, mountainous, and heavily settled regions (Checheno-Ingushetia, Georgia, Azerbaijan, and the like) is envisioned.

Non-explosive, above all vibration, seismic waves sources will find broader use. They are being built at the Gomel special design-technological bureau of seismic equipment under the direction of A. S. Shaginyan. Special attention will be devoted to development and organization of series production of SVA-10/100 arctic vibrators for the conditions of Western Siberia and the Far North. Construction of an experimental industrial complex to produce non-explosive seismic signal sources in the city of Gomel is planned for completion in 1986-1987. Its launching will insure production of SV-10/150 and other vibrators for oil-gas extraction and other sectors of the economy. The introduction of non-explosive seismic sources will increase the labor productivity of seismic parties and make labor-intensive and unsafe blast drilling unnecessary.

The use of well seismic exploration, above all verticl seismic profiling, is an important direction of work to raise the efficiency of geophysical exploration.

As methodological refinements seismic explorers of the Ministry of Petroleum Industry will use multiple and areal observation systems with higher multiples (24-28). Great importance is attached to comprehensive use of the data contained in longitudinal, transverse, and converted waves, in other words, using multi-wave seismic exploration. Seismic methods will be more actively combined with industrial geophysical testing and other methods of exploration (high-precision gravity exploration, electrical exploration, and so on).

Along with the growing complexity of field observations it is natural to plan also for more complex flowcharts of computer processing of seismic exploration materials, which will require a substantial enlargement of the computing capacities of the Ministry of Petroleum Industry's geophysical trusts. This is the most important and difficult question to solve. That fact that geophysicists today do not have computers capable of 100-200 million ops/second and more is markedly retarding the application of certain highly efficient and informative methodologies such as spatial observation systems and predicting the geological cross-section. During 1986-1990 all geophysics regional computing centers of the ministry are to be re-equipped with powerful, unified-series computers. The Central Geophysics Expedition has formulated an up-to-date and highly efficient system for processing seismic exploration data, the STsS-3 system. It is also being used at many computing centers of the USSR Ministries of Geology and Gas Industry. The STsS-3 system will be developed further to perform more complex geological tasks.

The use of new methodological procedures and hardware in seismic exploration will insure the receipt of high-quality, more precise information materials, improve the resolution of time-based resulting cross-sections, and make it possible not only to solve more complex problems of studying the structural characteristics of non-anticlinal type objects but also to predict the material composition of sedimentary rock and identify oil and gas reservoirs in it with more confidence. In addition, there will be increase in the depth of testing and reliability of tracking reflecting horizons and the confirmability of structural formations, despite their being much more complex and smaller.

The traceability of the deepest horizons of the Devonian in the Ural-Volga region and the Permian-Triassic in Dagestan, the Stavropol region, Mangyshlak, and Yuzhnaya Emba will increase significantly.

Possibilities are expanding for identification of nonstructural types of geologic objects, reefs in Bashkiria, Saratov, Volgograd, and Perm oblasts, Stavropol Kray, and Belorussia, traps confined to graben-like troughs in Bashkiria and Kuybyshev Oblast, and the valleys of paleorivers in Krasnodar Kray, Tataria, and Perm Oblast.

Active introduction of detailed seismic exploration in the stages of operations drilling and deposit exploitation will be a fundamentally important direction of work, primarily in the oil regions of Western Siberia.

Modern seismic exploration and its spatial modification make it possible to study the geologic structure of deposits with greater detail, improve the correlation of strata, identify zones of oil and gas reservoir discontinuities, and determine the contours of the deposit more precisely. This information must be taken into account in formulating plans for exploitation and locating producing wells, especially in cases where reservoirs and entire deposits have complex structures. It is highly efficient to introduce detailed seismic exploration in practical planning and monitoring the exploitation of deposits. The Ministry of Petroleum Industry has now prepared a specific program for the 12th Five-Year Plan which envisions detailed geophysical work at more than 70 deposits in different oil extraction regions, including Western Siberia. One of the most important tasks of the sector's geophysical service will be to carry out this program.

Industrial geophysical work done in the Ministry of Petroleum Industry makes up more than 60 percent of all geophysical testing of oil and gas wells in the country. The geological and technological problems that are solved by means of industrial geophysics in exploration, well drilling, and exploitation of deposits have not changed significantly in recent years. But the conditions of testing have become markedly more complex. Low-porosity, mudded-off reservoirs with complex structure and mineral composition have become important targets of exploration, as have strata that have been washed out by fresh water with various impurities. The average depth of wells is increasing, and associated with this the bottom-hole pressure and temperature rise, the volume of slant hole directional drilling is growing, and use of special drilling muds is expanding (muds based on petroleum, with addition of viscosity regulators, water-loss muds, and so on).

Under these conditions major scientific-technical and methodological steps are planned in the 12th Five-Year Plan to insure efficient performance of the tasks placed before the industrial geophysics service.

1. Replacement of analog surface equipment with computerized well-logging stations with digital recording and using a standardized geophysical information-computing system. For geophysical testing with the rapid construction of producing wells in Western Siberia a transition is planned to the use of permanent computerized stations with a full cycle of all types of testing (geophysical, geologic-technological, and the like). In other regions the use of mobile well-logging stations mounted on a single vehicle chassis (laboratory and winch) is envisioned.

2. Broad use of multipurpose apparatus with a higher degree of integration of methods, insuring performance of the compulsory set of tests of producing wells with one or two instruments (one or two in an open hole; one in a cased well).

3. Inclinometer measurements during the drilling of slant hole directional wells using non-cable communication lines, especially at the deposits of Western Siberia. A steady expansion of the capabilities of these systems is planned to combine part of geophysical testing with the drilling process.

4. Increasing the heat-pressure resistance of geophysical apparatus and equipment for strata testing when testing wells being drilled to 250 degrees C. and

150-170 megapascal and the temperature resistance of exploitation monitoring equipment to 180-200 degrees C. and also an increase in the corrosion resistance of equipment operated in aggressive media.

5. Development and introduction of efficient new methods of well testing and studying the space near and between wells; development of hardware and software for detailed study of the geologic structure of oil and gas deposits based on combining the techniques of field and industrial geophysics.

6. Continuing supply of up-to-date computing and data transmission equipment to geophysics enterprises, organizing data banks on their basis, and raising the efficiency, precision, and operationality of performing the jobs of prospecting, exploration, and exploitation of oil pools and drilling wells.

Realization of these directions of scientific-technical progress in geophysical well testing will make it possible for the sector as a whole to raise the efficiency of geological exploration work and deep exploratory drilling, reduce the construction time of wells, increase the oil recovery at deposits being exploited, and significantly raise the labor productivity of geophysics parties.

In the 12th Five-Year Plan the Ministry of Petroleum Industry, together with the ministries of Geology, Gas Industry, and Instrument Making, Automation Equipment, and Control Systems, plans to begin development of a new generation of logging stations, laboratories, and winches and supply them to geophysics enterprises (see table, next page). All the stations and laboratories will be computerized and will include a unified information-computing system regardless of their designation.

Special attention will be devoted to development of the Sibir computerized logging system for the work program during the high-speed drilling of producing wells in Western Siberia (where each brigade drills more than 60,000 meters a year). It is envisioned that industrial geophysics parties will be at the drilling site 24 hours a day during the drilling of well clusters. The party must insure monitoring of the technological parameters of drilling for the purpose of controlling the trajectory of the well and optimizing the drilling mode; it will condust the set of compulsory geophysical tests with cable instruments in the open hole and after the well is cased and will monitor the parameters of the cement mixture when the well is being cemented up. The party is equipped with a computerized laboratory that enables it not only to fully automate the measurement process, but also to provide operational findings on measurement results right at the drilling site using minicomputers. The permanent logging winch has electric drive. The party's technical equipment also includes surface technological monitoring sensors, a bottom hole inclinometric system with a non-wire communications channel, and a set of well equipment.

The first experiment with this type of labor organization and technical equipping of an industrial geophysics party in several leading brigades in Western Siberia produced a positive economic impact by precluding downtime both for well-drillers and logging workers and through the use of timely, complete information needed in well construction.

Table. Set of Surface Technical Equipment for Geophysical Testing of Oil Wells

Название (Name)	Тип (Type)	Глубина скважины, м (Well Depth, m)	Шасси (Chassis)	(1) Состав аппаратуры и оборудования: Информационно-вычислительная система (2)	Привод лебедки (3)	Средства метрологического контроля (4)	Прочее оборудование (5)	Область применения (Area of application)
Лаборатория каротажная компьютезированная (6)	ЛКС-7П (LKS-7P)	7000	КамАЗ-4310 (KamAZ-4310)	Унифицированная геофизическая (12)	—	Имеются (yes)	Электрогенератор, радиостанция, бытовой отсек (16)	Бурящиеся и действующие скважины (21)
Подъемник (winch)	ПКС-7ПГ (PKS-7PG)	7000	КамАЗ-7310	—	Гидравлический (14)	—	Средства малой механизации (17)	Глубокие бурящиеся скважины (22)
Станция каротажная компьютезированная (7)	СКС-4ПГ (SKS-4PG)	4000	КамАЗ-4310	Унифицированная геофизическая (12)	То же (same)	Имеются (yes)	То же (same)	Скважины эксплуатационного бурения с проходкой менее 60 тыс. м/ст.-год (23)
	СКС-4ПЭ (LKT-4P)	4000	КамАЗ-4310		Электрический (15)	(same)	» (same)	
Лаборатория каротажно-технологическая компьютезированная (стационарная) (8)	ЛКТ-4П (PK-4PE)	4000	Вагон-домик (11)	То же (same)	—	(same)	Бытовой отсек (18)	Скважины эксплуатационного бурения с проходкой более 60 тыс. м/ст.-год (25)
Стационарный подъемник (9)	ПК-4ПЭ	4000	То же (same)	—	Электрический (15)	—	Средства малой механизации (17)	
Станция геолого-технологическая каротажная компьютезированная (10)	СГТК-7П (SGTK-7P)	7000	» (same)	Унифицированная (13)	—	Имеются (yes)	Бытовой отсек (18)	Поисково-разведочные скважины (24)
Подъемник (winch)	ПКС-5ПГ (PKS-5PG)	5000	КамАЗ-4310 (KamAZ-4310)	—	Гидравлический (14)	Имеются (yes)	Вышка (19) высотой 17 м, лубрикатор на давление 21 МПа	Действующие скважины, прострелочно-взрывные работы (26)
	ПКС-4ПГ	4000	КамАЗ-4310	—	То же (same)	—	Лубрикатор на давление 7 МПа, средства малой механизации (20)	—
Лаборатория перфораторная (Perforator laboratory)	ЛПС-7	7000	ГАЗ-66 (GAZ-66)	—	—	—	—	Поисково-разведочные и добывающие скважины (27)

[See Key, next page]

[Key to table, previous page]

(1) Apparatus and Equipment;
(2) Information-Computing System;
(3) Winch Drive;
(4) Metrological Means;
(5) Other Equipment;
(6) Computerized Logging Laboratory;
(7) Computerized Logging Station;
(8) Computerized Logging-Technological Laboratory (Permanent);
(9) Permanent Winch;
(10) Computerized Geologic-Technological Logging Station;
(11) Field Camp Railroad Car;
(12) Standardized Geophysical;
(13) Standardized;
(14) Hydraulic;
(15) Electrical;
(16) Electrical Generator, Radio Set, Living Quarters;
(17) Small Power Tools;
(18) Living Quarters;
(19) 17-meter Tower, 21-megapascal Lubricator;
(20) 7-megapascal Lubricator, Small Power Tools;
(21) Drilling and Operating Wells;
(22) Drilling Deep Wells;
(23) Producing Wells with Drilling of More Than 60,000 meters/year;
(24) Prospecting and Exploratory Wells;
(25) Producing Wells with Drilling of More Than 60,000 meters/year;
(26) Operating Wells, Perforating and Blasting Work;
(27) Prospecting, Exploratory, and Producing Wells.

A very important direction of industrial geophysics work will be development and introduction of measurement of bottom-hole parameters during the drilling process, which is related to the problems of drilling slant hole directional wells. The existing technology for large-scale drilling of such wells with periodic monitoring of trajectory using cable-type instruments involves significant losses of time for measurement and adjustment of the hole. The use of bottom-hole telemetric systems with non-wire communications channels that insure monitoring and control of the well trajectory during the drilling process make it possible to cut drilling time and achieve greater precision in putting the bottom hole into the target area. In the 12th Five-Year Plan it is planned to begin industrial introduction of bottom-hole inclinometric systems with non-wire electromagnetic data transmission channels. Data collection and processing and presentation of results will be done right at the drilling site.

The most pressing tasks in this area are increasing the reliability of well apparatus and increasing the range of depths which afford dependable reception of the bottom-hole signal and the number of parameters measured during the drilling process. In connection with the development of high-speed operations drilling in Western Siberia it will be necessary to solve the problem of combining some compulsory geophysical measurements with the drilling process using sensors housed on the drilling tool.

Techniques of studying the cross-section during the drilling process based on testing of slag, cores, drilling mud, and measuring the parameters of the drilling mode are to receive new impetus in the 12th Five-Year Plan. It is planned to complete the transformation, begun in the mid-70's, of gas logging parties into a geologic-technological testing service. Their basic technical equipment should become SGT-2 and SGTK stations.

The system of programs for automated computer processing and interpretation of geophysical well testing data, called the ASOIGIS and developed by the Central Geophysics Expedition of the Ministry of Petroleum Industry, is to be introduced in the practical work of the geophysics service more broadly than in the 11th Five-Year Plan. This sytem should be introduced in most of the geophysics trusts, and in Western Siberia practically all detailed geophysical well testing will be done by computer. We must insure introduction of the network of subscriber computing points based on the VT-20 minicomputer (produced in Hungary) to receive and transmit information from industrial geophysics offices and expeditions to the computing centers of the trusts. This will make it possible to process well testing data faster and better.

The geophysics service of the Ministry of Petroleum Industry faces important and difficult challenges in the 12th Five-Year Plan. With significantly more complex mining-geological and technological conditions for geophysical work it will be necessary to insure a high rate of scientific-technical progress and raise the efficiency of petroleum geophysics on this basis. The efforts of the specialists of scientific research, planning and design organizations, instrument making enterprises, and production trusts of the geophysics service of the Ministry of Petroleum Industry must be subordinated to this goal.

11176
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OIL AND GAS

LOCAL DRILLING SPECIALIST DISCUSSES OUTLOOK FOR TYUMEN

Moscow IZVESTIYA in Russian 1 Sep 85 p 2

[Interview with Grennadiy Mikhaylovich Levin, chief of Drilling Directorate No 2 in Surgut, interviewer not specified, in article: "It Depends on Each of Us"; date and place not specified]

[Excerpts] The name of Gennadiy Mikhaylovich Levin is well-known beyond Tyumen Oblast. It carries authority among oil workers of the whole country.

Several years ago G. Levin was charged with a new mission: having transferred from Nizhnevartovsk to Surgut, he headed the huge drilling directorate. Very soon this enterprise achieved the level in drilling footage that before was within reach of only the very best individual crews of Glavtyumenneftegaz.

[Answer] Aside from the other reasons about which much has been said at various levels and much has been written, in particular by the crew from IZVESTIYA in Western Siberia, there is--I am expressing my personal conviction--the following reason. Even though this sounds somewhat strange, in the northern oilfields there gradually formed and took hold the opinion that an increase in oil production does not depend much on the efforts of the oil workers themselves. Therefore a strategic miscalculation was allowed: construction of surface facilities at fields was lackadaisical; few new deposits were brought into production. Think of it, they said if they didn't get the full, planned amount of oil at one field, it could be made up from the Samotlor, Mamontovskoe, Fedorovo, and other similar fields.

[Question] One of the toughest questions is the expansion of material, technical and experienced personnel assistance to Western Siberia. Drillers from the Volga, Ukraine, Caucasus, and Urals are drilling almost half of the wells in Tyumen today. And, judging from appearances, in the next five-year plan their participation in this business will be even further increased.

[Answer] The party and the government foresee further development of truly national assistance to Western Siberia. Let's take, as an example, technical assistance in the drilling business in particular, since I am well acquainted

with it. Sometimes it is claimed that for over two decades--from the beginning of the development of the oil and gas bearing regions of Western Siberia--nothing has changed in the technical capabilities of the drillers. I would not be so categorical. The new drilling rigs from Uralmash, the 3000-EUK, have arrived to replace the BU-80 rig. The flexibility of turbodrills has noticeably increased: they can be selected so as to use either one or two pumps at once. But...

The trouble is that the 3000-EUK rigs are hard to assemble; they use a great many chains which cause a lot of trouble, and a great deal has to be redone and corrected, to adjust it for conditions at the sites, among the taiga and swamps. Or take drilling bits. There are no pretensions toward permanent cutting teeth--the foundation on which they are embedded may last 100 hours of drilling, or it might fall apart after 10-15. The service life of completely identical drilling bits varies by 5-6 times, and you never know in advance what to expect.

On the other hand, as far as the casing produced by several of our enterprises is concerned, you're just asking for a failure when you use it. Accurate accounts of this were given by the IZVESTIYA field crew investigating Western Siberia, referring to the sad experience of my colleague Anatoliy Dmitriyevich Shakshin. We also have disruptions quite frequently because of casing. What a vexing loss of expensive materials, financial resources, and human labor! The plants just are not able to set up production of casing with a reliable buttress thread.

In the face of all this I want to say: hope for help, but don't make a mistake yourself. Unfortunately our economists forget about this. They are ready, judging from their orders, to requisition resources from almost the entire country. This is a parasitical attitude of mind, not an economical, governmental approach.

[Question] Out of all the planned oil which the Tyumen workers failed to supply to the national economy, a large portion falls on Nizhnevartovskneftegaz, where you worked at one time. How is it possible to explain the difference in figures between it and Surgutneftegaz? After all, the natural and geological conditions of the regions are approximately the same.

[Answer] In part it has already been discussed: they wanted to resolve too many unsettled questions of the development of the region as a whole at the expense of the giant fields, such as Samotlor. I will add from my own experience that when Nizhnevartovskneftegaz, achieved huge proportions, it changed into an extremely complex and hard-to-manage production entity. It was quite correct to turn over part of the productive areas to development by the Tartar oil workers. And now yet another association, Varegganneftegaz, has detached itself from a giant field. I am convinced that these measures will bear good fruit.

Cattle-breeders sometimes say this: The cow's milk is on its tongue, emphasizing the importance of fodder. But we have our own formula: oil can be found on sharp bits. It was gratifying to hear it emphasized on a chief directorate

conference call the other day: specifically the drillers lead the way to the oil, and if for some reason the drilling crew stands idle, this can be qualified only as a crime. Such harsh but just words, one must confess, have not been uttered for a long time....

[Question] And now, Gennadiy Mikhaylovich, several words on UBR-2 [Drilling Directorate No 2], which you are heading today. How does the collective intend to complete the 11th Five-Year Plan? How does one explain the stability in its work figures? And not just stability--after all, the figures are steadily increasing....

[Answer] The chief task which the directorate's collective put before itself was to complete the five-year plan for footage of deep oil wells by the middle of September. For this we must drill through 2.75 million meters of rock. All the data indicate that this will be the case. In the time remaining before the end of the year we will drill another 150,000 meters, which is equivalent to putting an additional 45-50 producing wells into operation.

Shukyurov's Komsomol youth collective finds itself in a peculiar situation. We are drilling now at two fields, the Yaunlor and the Lyantor.

So here, the remote outskirts of the deposit fell to the lot of the young drillers, next to the famous Fedorovka, where well depths exceed 2,500 meters. However this brigade too goes on a 100,000 meter schedule. The lads want to prove--and I am sure they will prove--that all over Western Siberia, at any deposit, 100,000 meters is a feasible achievement for a drilling crew.

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OIL AND GAS

BAKU FACTORY READY TO PRODUCE OFF-SHORE PLATFORMS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 22 Aug 85 p 1

[Article by I. Kuliyev and D. Melikov, special correspondents, Baku: "Islands of Steel"]

[Text] Beyond the turquoise buildings of the as yet unfinished yard gently rolls the Caspian. Resting on the slips right beside the blue waters is a metallic behemoth - the first block of platform No 6. Today is a special day - the finished block is to be "thrown" in the water. Actually, today is the birthday of a new enterprise.

The first block is a structure weighing over 3500 tons. From the looks of the giant, nothing could budge it. Rauf Tariverdiyev, deputy director of the enterprise still in its construction stage, points to two stocky contraptions brought flush with the base of the block.

"These pushers can 'throw' much heavier weights than this. Platform No.6 is a 'midget' compared to our future series production such as, for example, platform No.8 which is now being assembled on a slip and which is almost twice as large. The smallish size of the first block does not allow us to use a special barge. That is why we designed two tipple frames that will take the brunt of the weight and set the block afloat".

The steel block, prodded by the pushers, began moving down to the sea and soon came to hover over the water at a height of four meters. A tense silence ensued.

"This is the most crucial moment", we are told by I.Chernov, chief, Glavmorstalkonstruktsiya MA, Ministry of the Gas Industry. "The block's center of gravity is located at some point between 50 and 51 meters. When that point is reached and passed the block will for a brief moment freeze in a position of unstable equilibrium, like the scale of a balance. Meanwhile out in the water we will have positioned two giant pontoons under the overhanging part of the platform. When the steel block is past the center of gravity it will tilt downward with the entire weight being absorbed by the

tipplers and the pontoons alike. Several tugs will then join in the action, hauling the block out to sea where the tipplers will gently set it afloat".

What Ivan Nikolayevich is telling us is taking place today, but the first stage of the unique operation happened yesterday - the giant block was moved to the very edge of the sea to overhang the water.

It is this enterprise, known as the Baku Plant for Deepwater Foundations but generally abbreviated to BZGO, that the oilmen of the Caspian are pinning all their hopes on. Its commissioning will in fact herald a new massive drive for the underwater treasures of this extraordinary basin.

Every stationary platform that this enterprise will produce is practically an entire oil and gas field by itself. 18 to 27 wells can be sunk from its top deck. Two proven, very promising fields, the imeni 28 April and the imeni M.Kaverochkin, are eagerly awaiting the arrival of these islands of steel. This part of the Caspian is up to 200 meters deep. The giant stationary platforms assembled by the BZGO are specifically designed for just these conditions.

The blocks, resting on special piles driven 150 meters below the bottom of the sea, are, so to speak, nailed down to a specific spot on the surface. They are not afraid of the hurricane winds that frequently blow across the Caspian. Experts guarantee the platforms a lifespan of fifty years.

The blocks being assembled at the BZGO will weigh up to 10500 tons, with the on-deck "stuffing" included - about 24 thousand tons.

A word about the "stuffing". Deployed on the 1-hectare deck will be a helicopter pad, two drills, several high-powered pumping and electric power stations. Other features of the "stuffing" include the most advanced drilling and operational equipment with all work processes highly automated and mechanized, in a word - the modern day, perhaps even the tomorrow of oil and gas extraction.

The platform will have a workforce of about 70 men. "The living arrangements are like those of a good hotel", say specialists acquainted with the blueprints of future stationary sea platforms.

The BZGO is an enterprise born of the joint work of specialists from the USSR, France, Sweden and the FRG. The plant is equipped with modern machinery for cutting and welding pipes of the most varied diameters and configurations. Frequent and welcome guests in its shops are specialists from the Electric Welding Institute imeni Ye.O.Paton. The scientists tackle problems relating to the mechanization and automation of welding processes, are developing new technologies, welding powders and better control and measuring instruments.

The institute's scientists played an active part in the commissioning of the platform's first block and now intend to open their own specialized laboratory at the plant. The Kievans' interest in the Baku enterprise is no accident. Welding is the primary technological process at the plant which in a short time succeeded in training about 500 highly qualified welders and cutters.

The enterprise's pride is an automated line for the figure cutting of pipe ends. This truly unique machinery allows pipes up to 6 meters in diameter and up to 90 millimeters thick to be cut with the utmost precision and is capable of cutting several pipe sockets into one spot.

One hundred percent of the weldseams are checked by ultrasound, X-ray and gamma-ray apparatuses. The greater part is doublechecked. This is to ensure a high degree of reliability in the steel structures, enabling them to withstand the heavy blows of the waves.

To sum up: the BZGO is a project slated for commissioning in the current year. The enterprise is still abuilding, the enterprise is already producing the goods.

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OIL AND GAS

RESEARCHERS IN UKRAINE DEVELOP GAS-LIFT COMPRESSOR

Kiev PRAVDA UKRAINY in Russian 19 Sep 85 p 2

[Article by V.Khokhlachev: "The Oil Fountains' Second Wind"]

[Text] Ukrainian scientists have developed a powerful compressor capable of ensuring the most promising method of oil extraction - the gas-lift process. The necessity to make a rapid transition to this method was stressed by General Secretary of the CPSU Central Committee M.S.Gorbachev during his visit to the Tyumen area.

The heart of this unique apparatus whose function is to compress and pump gas and which was developed by the VNII of Compressor Machine Building in Sumy [Ukraine] is an unusual cylinder forged out of superstrong steel. This hermetic unit designed solely for peaceful purposes can withstand tremendous pressure, greater even than the pressure produced in the barrel of a big-caliber artillery piece.

"In point of fact, what we have created here is the third generation of Soviet high-pressure generators and transporters without which the development of many promising technological processes is today unthinkable", says chief of the institute's turbocompressor research laboratory G.A.Bondarenko. "The salient assets of this new breed of high-powered centrifugal compressor are its high productivity and low metal-intensiveness. Unlike their piston analogues, these machines guarantee an uninterrupted flow of compressed gas, are operationally durable and reliable, produce no destructive vibration and the gas is compressed without being polluted by lubricating oils".

The development of a machine with such attributes was made possible by using an original solid-state rotor with runners, extrasturdy glue-joining of metals and vacuum soldering in assembling complex parts. The light weight overall of the machine stems from such technological innovations as a compact gas cooler whose dimensions are ten times less than the bulky "coil" batteries of tradition."

The novelty is the fruit of the joint creative endeavor of research teams from Sumy, Leningrad, Moscow and Kazan working under the scientific guidance of professor K.P.Seleznev of the Leningrad

Polytechnical Institute imeni M.I.Kalinin. It will be utilized in the production of ammonia and methanol, the hydrogen cracking of oil and the pumping of natural gas into underground repositories.

But those who most eagerly anticipate its delivery are the men of the gas and oil fields. This higly efficient machine will breathe a new strength into the fountains of active fields. As noted by M.S.Gorbachev at the party and economic aktiv of Tyumen and Tomsk oblasts, the age of easy oil is drawing to a close, the time has come to initiate its forced extraction. And this is exactly where these high-powered force pumps come in - their stimulating "injections" will help raise the most viscous and most difficult to extract deep-lying oil to the surface.

Series production of the first generation of Soviet high-productivity turbocompressors designed to intensify the extraction of crucially important fuel, energy and chemical raw materials in Western Siberia will be launched already in the current year by the collective of the Sumy machine-building production association imeni M.V.Frunze.

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OIL PRODUCTION BEGINS ON YAMAL PENINSULA

Moscow IZVESTIYA in Russian 21 Oct 85 p 1

[Article by stringer A.Trutnev: "The Difficult Oil of the Yamal"]

[Text] The first oil from the Novoportovskiy oilfield on the Yamal peninsula has begun filling the collector reservoirs. This treasure house is one of the most northerly oilfields in the world. The collective of the recently established production association "Nadymgazprom" is currently engaged in the further exploration and organization of the Arctic field. The following report was filed by our stringer on the spot A.Trutnev.

Novyy Port is a little settlement about 15 kilometers from the oilfield. Its name was given to the newly discovered deposits as well. The road to that achievement was not an easy one, proving a severe test for the production association "Nadymgazprom". Production collectives had to be organized which could in a short period of time lay the groundwork for experimental work on the Novoportovskiy field literally from scratch. The assigned objectives were attained by drawing on the experience gained at Medvezhy, Urengoy and Yamburg. The large production subdivisions necessary to do the job were created. New helicopter pads with a fueling station appeared in the Arctic tundra and an "Ekran" system TV complex was put into place.

A new dot has recently appeared on the map of Tyumen oblast - the township of Yamalskiy. It is destined to become the operational base for the men working the Novoportovskiy deposits. Even rows of well-equipped 400-bunk hostels line the streets. The construction of a bakery is nearing completion and the building of a bathhouse and laundry are in full swing.

18 wells have already been sunk and the driving of several more is about to be completed. The productive horizons of the field are like a layered cake of gas, petroleum and condensate. The oil is high quality, but it contains a lot of paraffin and this can hamper the transportation process. This problem is currently being addressed by the Novoportovskiy multiple expedition of the VNIIgaz research institute.

A long pipe leads out to the tundra from a well topped by a "herringbone" of lock fittings. All around the well, working the manometers and cranes, are people. The hands of the manometers spring into action, and then a shrill whistle breaks the silence. At the same instant a flare traces a fiery arc in the direction of the pipe's mouth. There is a thunderous blast followed by billowing orange flames. Gradually the fire changes its hue from orange to dark red. The chief geologist of the Novoportovskiy administration V.Gontarenko, trying to outshout the roar of the flames, explains:

"That's the off gas. It is lighter than oil, so it comes out first. And there comes the gas condensate... Oil! She's spouting oil!"

The fire burns on for several minutes as though saluting the trailblazers who have brought the first Yamal oil to the surface. The precious hydrocarbonic liquid is the piped into a collector reservoir.

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OIL AND GAS

BRIEFS

NEW "URALS" TRUCKS FOR TYUMEN--The Urals Truck Plant's collective worked with special diligence on this order. And here in mid-September, a month ahead of schedule, the cars have departed from the rail sidings of the plant for the West Siberian oil and gas fields. Two hundred and fifty heavy-freight Ural-4320 trucks, with a capacity for cross-country travel and diesel engines, have been shipped to the oil and gas workers of Tyumen. All of them are marked with a distinctive pentagon. In the 12th Five-Year Plan the Urals automotive workers will organize production of the caterpillar-tracked snow and swamp transport vehicles necessary for the development of oil and gas deposits. The high technical level of the new machines will be guaranteed by the introduction of modern technological processes and highly efficient automated equipment. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 40, Oct 85 p 7] 12805/9274

OIL DISCOVERED ON THE POLISH SHELF--Warsaw--During the drilling of a routine offshore well from a platform belonging to Petrobaltik, a joint organization of three countries (USSR, GDR, PNR), an oil and gas show has occurred. According to the estimates of specialists, the oil which has been discovered is of high quality. The 5-year search carried out on the Polish and Soviet shelf by the international organization Petrolbaltik makes it possible to conclude that this is a region with commercially productive oil. Two oil and gas deposits have been discovered on the Polish shelf. Of course, even more detailed research and calculations will be necessary to make decisions on their commercial exploitation. [Text] [By O. Losoto] [Moscow PRAVDA in Russian 16 Oct 85 p 5] 12805/9274

REACTIVATED WELLS--Chernigov--The production crews of foreman P. Maksimenko, M. Kozinets, V. Nazaruk, drillers V. Dotsenko, P. Kuziv, S. Gumenyuk, and the well maintenance crew led by foreman N. Yurchenko have become the victors in the socialist competition of oil workers in honor of the 27th Party Congress. The enthusiasm and high skill of the workers and the oilfield engineering and technical personnel secured the collective victory: Chernigovneftegaz extracted its 100-millionth ton of crude oil. This occurred 72 days before the target date. Ukrneft achieved such high rates of field development for the first time. The experience of the Chernigov workers is especially valuable because they stubbornly fight to increase the yield of the reservoirs. At the Gnedintsevskoe deposit in-situ wet burning was successfully applied at depleted and marginal wells. This made it possible to get almost 90,000 extra tons of

crude oi. [Text] [By SOTSIALISTICHESKAYA INDUSTRIYA stringer Zh. Tkachenko] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 29 Sep 85 p 1] 12805/9274

CRUDE OIL EXTRACTION ABOVE PLAN--Neftyanye Kamni, 10 Sep--The crew of Oil and Gas Extraction Unit No 4 of the 27th Party Congress Production Association recovered almost 1,000 tons above its 8-month assignment. This is 370 tons more than what was pledged at the beginning of the year. The success was achieved through the use of reserves, intensified extraction of oil, and improvement in the technological procedures of well exploitation. Suffice it to say that they got an additional 127,000 tons of liquid fuel from conducting various geological and technological measures here. The crew of the third oil and gas extraction section, where Mamedkuli Guliyev and Takhir Abasov serve as foremen, is setting the tone in the socialist competition for fulfilling the final year of the five-year plan ahead of schedule. All 59 of the crew's wells are working under optimal conditions. Striving to honor the 27th CPSU Congress and the 31st Congress of the Azerbaijan Communist Party, the unit's oil workers are comprising to extract another 400 tons above plan of liquid fuel. [Text] [By A. Kyazimov] [Baku VYSHKA in Russian 11 Sep 85 p 2] 12805/9274

CSO: 1822/101

COAL

SYNOPSES OF ARTICLES IN UGOL UKRAINY, OCTOBER 1985

Kiev UGOL UKRAINY in Russian No 10, Oct 85 p 48

UDC 622.232.8.001.86:551.2/.3 "sh. im. Krasina"

THE WORK OF THE GROZ BRIGADE IN PAIRED LONGWALLS

[Synopsis of article by V. A. Dzhamkochan, p 14]

[Text] The brigade of A. F. Vlasov at the Rostovugol Association's Mine imeni Krasin extracts at least 1,004 tons of coal each day from a longwall on a thin seam. Organization of work, technical-economic indicators, obligations. 1 illustration.

UDC 622.33:622.012.22

THE USE OF MICROORGANISMS IN NONTRADITIONAL COAL EXTRACTION TECHNOLOGY

[Synopsis of article by B. Ye. Grepinger, V. A. Shinkovskiy, and P. I. Andreyev, pp 16-17]

[Text] The microbiological action on a seam, realized by weakening it and its contact with the enclosing rock or by increasing layer energy through biological saturation with gas and consequent creation of conditions that insure gas-dynamic destruction of the coal. 4 references.

UDC 622.273.217.5

TECHNOLOGY FOR SEPARATE REMOVAL OF COAL AND INTRUDING ROCK AND PILING THEM

[Synopsis of article by V. V. Vystorop and A. V. Zarya, pp 17-20]

[Text] The results of an experimental test under mine conditions of a technology for separate removal of coal and intruding rocks of the soil with a KMK-97D unit and pneumatically piling them in the worked-out space of the cutting face. 3 illustrations.

UDC 622.86:622.026.7

THE IMPACT OF SITES OF ROOF SETTLING AND COAL EXCAVATION ON INRUSH FORMATION

[Synopsis of article by V. G. Ivanov, N. S. Kuzmenko, and A. N. Pugachenko, pp 20-21]

[Text] The relationship between rock inrushes in the longwall and characteristics of performance of the technological processes of coal extraction and roof settling. Proposals on reducing the susceptibility of roof rock to breaking and on improving work safety.

UDC 65.016.4:622.2:622.012.22

INCREASING THE CONCENTRATION OF PRODUCTION AND MINE WORK IN DEEP SHAFTS

[Synopsis of article by N. D. Prokopenko and Ye. N. Bogatko, pp 22-23]

[Text] Economic aspects of increasing the concentration of production and mine work, recommendations on improving planning and stimulation for concentration of production. 1 table, 2 references.

UDC 622.7.013

PLANNING THE NUMBER OF WORKERS IN THE ENERGY-EQUIPMENT SERVICE OF A COAL ENRICHING FACTORY

[Synopsis of article by V. M. Neskromnykh, A. I. Okonishnikov, and A. A. Stepanenko, pp 23-24]

[Text] Brief analysis of existing norms and development of new norms for the number of repair workers at coal enriching factories. Formulas for determining the number of workers in the energy-equipment service. 1 table.

UDC 622.232.5:622.267.53

STRIP EXCAVATION WITH THE AGS AGGREGATE IN A SEAM WITH BLOW-OUT DANGER

[Synopsis of article by V. I. Fishchenko, L. G. Semenov, and B. M. Naruzhnyy, pp 26-27]

[Text] The equipment used and its location; conditions and results of work on hydraulic cutting of a longwall at the Mine imeni 60-letiya Sovetskoy Ukrainy of the Donetskugol Association. Evaluation of the proposed technology. 3 illustrations.

UDC 622.285.031.2.116 (477.61/.62) (047)

THE MODULAR PRINCIPLE OF SECTION CONSTRUCTION -- BASIS FOR STANDARDIZATION OF MECHANIZED TIMBERS

[Synopsis of article by V. V. Geyer, pp 27-28]

[Text] The prefabricated section consisting of power elements -- communications modules and elements; obtaining different passports for cutting face timbers. Results of stand testing of the module and section. 2 illustrations.

UDC 622.274.063.46

TEST OF BARRIERS TO RETAIN RUBBISH IN STEEP SEAMS

[Synopsis of article by L. D. Tokar and V. D. Gayvoronskiy, pp 28-29]

[Text] Design and installation procedures for a retaining barrier for the rubbish pile, which is installed by remote control without human presence in the cutting face. The results of an experimental test of the work of the barrier. 2 illustrations, 1 reference.

UDC 622.73.001.33 (045)

REFINEMENT OF TECHNOLOGY FOR PREPARING ROCK IN HYDRAULIC MINES

[Synopsis of article by I. A. Lozovoy and A. B. Konovalov, p 30]

[Text] The work of a crushing-sorting complex with a metal trap used before non-pressure transport of bulk rock at the Mine imeni 50-letiya SSSR of the Krasnodonugol Association. 1 illustration.

UDC 622.01:629.114.4 "Rostovugol"

EFFICIENT USE OF VEHICLE TRANSPORTATION AT THE ROSTOVUGOL ASSOCIATION

[Synopsis of article by Yu. I. Litvinov, p 31]

[Text] Progressive know-how in managing vehicle transportation at the Rostovugol Association. 2 illustrations.

UDC 621.793-7.001.57:622.005

STUDY OF THE PROTECTIVE FEATURES OF ZINC DIFFUSE COATINGS

[Synopsis of article by N. A. Kudreyko, Yu. A. Agarev, and G. Sh. Yar-Mukhamedova, p 32]

[Text] The technology of application and results of laboratory studies of a zinc diffusion coating. 2 tables.

UDC 621.3.014.6:621.332.31:622.01

NEW DIRECTIONS IN THE DEVELOPMENT OF SYSTEMS TO MONITOR CURRENT LEAKAGE IN CONTACT GRIDS

[Synopsis of article by A. I. Trach, pp 33-34]

[Text] Improvement of means and methods of protecting against injury by electrical current in mine contact grids. Nontraditional methods of monitoring current leakage which insure joint operation of protective means and communications and telemechanics systems. Ways to improve operating indicators of protection. 2 illustrations.

UDC 622.24.053.94:622.233.016

CALCULATION OF THE PARAMETERS OF STABILIZATION OF THE FRAME IN ROTARY DRILLING

[Synopsis of article by S. D. Babarika, pp 34-35]

[Text] A method of calculating the parameters of stabilization of the drill frame in rotary drilling; worked out on the basis of a mathematical model considering the dependence of kinematic and power parameters of drilling on the defining factors of the drilling machine, with an arbitrary number of stabilizing devices. 2 illustrations, 1 reference.

UDC 622.832.815

PREDICTING BLOWOUT DANGER BEFORE OPENING UP SEAMS

[Synopsis of article by Yu. K. Kudreyko, pp 36-37]

[Text] The results of research and industrial test of the predicting technique worked out by "Maknii" and tested at Donets Basin mines. 1 table, 4 references.

UDC 622.831.322:550.832"313"

FORMATION OF STUDY CLASSES IN SOLVING THE PROBLEM OF PREDICTING BLOWOUT DANGER

[Synopsis of article by B. M. Ivanov, B. G. Surovtsev, and A. I. Rogozin, pp 37-38]

[Text] Method of forming study classes in solving the problem of predicting blowout danger in Donets Basin coal seams based on data from geophysical well studies. 1 illustration.

UDC 622.232.8:621.384

SAFE ZONES FOR OPERATING SHAFT-CUTTING MACHINES WITH INFRARED CONTROL

[Synopsis of article by V. A. Kononov, pp 38-39]

[Text] The use of infrared wireless control of loading machines reduces the probability of operator injury by at least 20 times. The optical situation in the cutting face is studied. 1 table, 3 illustrations, 1 reference.

UDC 622.481.24:622.817.47

PERMISSIBLE CONCENTRATIONS OF METHANE IN THE GAS-AIR MIXTURE

[Synopsis of article by V. G. Lavrik and V. D. Pronin, pp 39-40]

[Text] Forestalling protection when feeding a methane-air mixture to a boiler, and a proposal to establish a new normative content of methane in the gas mixture, below which it is not permitted to be delivered to the consumer. 1 table, 2 illustrations.

UDC [553.94:551.24.05(043)](477.62):622.01

THE INFLUENCE OF TECTONIC STRESSES ON THE RATE OF MOVEMENT OF EXCAVATIONS

[Synopsis of article by O. A. Kushch, V. S. Nikonets, and V. A. Korchemagin, p 41]

[Text] Reconstruction of mesoregional and regional stress fields in the Donets Basin. The influence of the Alpine field of stresses on the rate of movement of longwalls. 1 illustration.

UDC 622.847 "sh. Voroshilovgradskaya No 1"

WATER BREAKTHROUGHS INTO MINING EXCAVATIONS

[Synopsis of article by N. Ye. Makhteyev, p 42]

[Text] The mechanism of water breakthroughs into mining excavations at the Voroshilovgradskaya No 1 Mine of the Voroshilovgradugol Association, and preventing breakthroughs.

UDC 622.283.53.082.2

THE EFFECTIVENESS OF DRAINAGE TIMBERS WITH LARGE WATER INFLOWS INTO SHAFTS

[Synopsis of article by P. P. Galchenko, V. P. Drutsko, and L. S. Krastoshevskiy, p 43]

[Text] Variations of using various types of timbering for vertical shafts in conditions of large water inflows, and their effectiveness. Recommendations.

UDC 622.257.1:624.138.41

DIRECTIONS OF WORK TO IMPROVE TAMPONAGE WORK

[Synopsis of article by N. V. Mamontov and Yu. A. Veselov, pp 44-45]

[Text] Recommendations on improving the technique of plugging up shafts in fissured, water-bearing sandstones.

UDC 622.281:624.072.32:622.273.217.5

STRENGTHENING TIMBERING BY TAMPONAGE

[Synopsis of article by A. T. Shepelev, p 45]

[Text] Experiment with increasing the stability of mine excavations located in unstable rock outside the zone of influence of cutting work at the Donetskugol Association's Yuzhnodonbasskaya No 3 Mine, which is under construction. 1 illustration.

11176
CSO: 1822/116

OTHER SOLID FUELS

UDC 622.331.001

DISCUSSION OF WORK OF ACADEMY OF SCIENCES' PEAT INSTITUTE

Moscow TORFYANAYA PROMYSHLENNOST in Russian No 10, Oct 85 pp 3-6

[Article by N. S. Kostyuk, candidate of technical sciences, BSSR Academy of Sciences Peat Institute: "Main Directions of Research at the BSSR Academy of Sciences Peat Institute"]

[Text] Peat has a prominent place among the natural resources of the Belorussian SSR. In recent years a peat industry has been built on its basis which has made it possible to obtain up to 80 percent of our electricity from peat fuel, and this has been the basis for development of the region's production forces. Scientific research on peat is mainly concentrated at the BSSR Academy of Sciences' Peat Institute.

More than 7,000 peat deposits have been recorded in the republic; they have a total area of 2.5 million hectares or 12.5 percent of republic territory. At the present time geologic reserves of peat are about 4 billion tons, and balance reserves are 2.3 billion. Peat deposits are distributed over all rayons, and they differ considerably in dimensions, forms, and bedding. These indicators depend on the conditions of formation of the peat deposits, the geomorphology of the locality, and water-mineral feeding.

Work by the BSSR Academy of Sciences Peat Institute has shown that as the result of geologic transformations the republic has three clearly marked geomorphological regions: the north where moraine and terminal moraine deposits predominate; the central elevated plain composed of moraine and ancient alluvial deposits; and the south where fluvioglacial and alluvial deposits predominate. Lowland-type peat deposits dominate in all geomorphological regions, constituting 80.3 percent of the total area.

In the first years after the Great Patriotic War work to study peat resources in the republic was done by the BSSR Academy of Sciences Peat Institute jointly with the Rostorfrazvedka [RSFSR Peat Exploration] Institute. In 1952 a general work, "Torfyanoy fond Belorusskoy SSR" [Peat Resources of the Belorussian SSR] was published. Since 1953 Gostorfund [Administration of State Peat Resources] of BSSR Gosplan has been in charge of the questions of studying peat resources and planning and monitoring their use. In 1979 this organization revised and republished the guide to peat resources, which described 7,055 peat deposits. At the present time 40.8 percent of the total area of peat deposits is in use

as improved agricultural and forestry land, 17.3 percent is dedicated to peat extraction, 10.5 percent is set aside in preserves and other sites, and 31.8 percent is in its natural state. The map "Republic Peat Deposits" was published in 1954; it described the peat deposits and studied their stratigraphy. Maps of peat deposits for wax and hydrolysis production have also been produced. An estimate of bituminous and hydrolysis raw material reserves has been made.

Peat reserves in the republic are being used intensively. At the start of the 1980's the area of drained peat deposits exceeded 1 million hectares. They are being transformed into managed agricultural and forest lands and used for extraction of peat for fertilizer, fuel, and other purposes. The annual extraction of peat for the needs of the economy in recent years has averaged about 35 million tons. Plans call for improving 2.2 million hectares of peat bog soils. Depleted peat deposits, whose area reaches 200,000 hectares, are also being brought into development.

A great deal of work has been done in the area of the physics of peat. The nature and mechanism of heat and moisture transfer in peat and its heat physics, structural, and mechanical parameters have been investigated. Relationships have been identified between the physical characteristics and quality indicators of the finished output. A new method of estimating the degree of peat processing has been worked out.

An evaluation has been made of the processing capability of various mechanisms. The questions of friction and the carrying capacity of a peat bed, resistance to compression of peat earth by moving wheels, straight-line movement, and the turning of a caterpillar track, and the stability of vehicles on peat soil have been studied. Formulas were derived for practical use in designing vehicles and equipment.

Extensive studies are being conducted of the colloidal-chemical properties of peat: degree of dispersion, water-absorbing capacity, rheology, ion-exchange and electrophysical properties, and structural formative processes. The effect of mechanical influences and the introduction of surface-active agents on the dispersion of peat has been studied. The optimal values of technological parameters of humidity, pressure, and density have been determined on the basis of studies of peat dispersion. It has been established that when surface-active agents are introduced energy expenditures for mechanical processing of peat can be cut significantly. The role and impact of drying conditions and initial parameters on the quality indicators of the finished output have been identified.

A relationship was established between the strength of peat pieces, briquettes, and granules and the specific surface of porous space. The impact of the scale factor on the strength of peat pieces and granules was shown. It has been established that a minimally decomposed peat bed is anisotropic in strength. A relationship was identified between the energy-intensiveness of technological processes and properties of the bed and the design features of exploitation, processing, and shaping equipment. Studies were done to substantiate the norm for drying milled fields and the optimal shape and dimensions of pieces and granules and physico-mechanical properties of milled peat during extraction and

storage were established. The influence of slit trench excavation of a bed on the water regime of fields was studied. Work was done to substantiate the production-technical indicators of extracting milled peat.

Viewing peat as a three-phase system consisting of solid matter, water, and air, a nomogram was proposed which makes it possible to determine the mass and volume of the phases according to data on volumetric density.

On the basis of studies of the physico-chemical and autothermal processes that occur in milled peat during storage, a method was proposed for retarding the spontaneous warming of peat by introducing insulation units into storage areas during the season. This significantly reduces the spontaneous warming temperature and losses of organic matter. The method is finding application in industry.

Multipoint thermal gauges for monitoring peat temperature have been designed and put in series production. An objective technique for establishing the propensity of peat for spontaneous warming and combustion has been developed.

Technological charts for peat storage depending on its intended use have been proposed to reduce peat losses in storage.

It is recommended that the extraction of milled peat as a raw material for wax production be done by deep-trench excavation of the bed. A GShchF [possibly deep-trench milling unit] has been built and tested under production conditions.

It is proposed, to improve the quality of milled peat and its technological indicators, that the top layer of peat beds to a depth of 400 millimeters be worked by machine to prepare the bed for exploitation.

The relationship between cyclical collection of peat and the degree of processing of a bed has been substantiated and widely tested under production conditions. Studies of moisture-transfer processes made it possible to set a norm for drying a processed bed. Change in the mechanical and density properties of milled peat during storage (shrinkage, resistance to compression) were studied. It was established that for beds composed of peats in different degrees of decomposition the modulus of elasticity increases with an increase in the degree of decomposition and a decrease in moisture content. The coefficient of lateral expansion increases with an increase in the moisture content of the bed. Calculation formulas were obtained for determining these values and values of the coefficients of the resistance of minimally decomposed peat to compression.

A number of theoretical development projects helped substantiate and introduce new technologies and equipment in the peat industry. The MSK machine, which is manufactured in series production, was built to mechanize the labor-intensive operations of drying peat pieces. One machine replaces 25 workers.

The Peat Institute has proposed a technique of trench milling of a bed, which is important for the continued development of the peat industry. This technique can be used to extract peat for fuel and other purposes. The MBT-500 and MBT-600 trailer machines with productivity levels of 3,000 and 5,000 tons a year respectively have been built to extract piece peat by this method. The self-propelled MTK-2.8T with a large capacity (10,000-12,000 tons a year) has also been built.

The principle of deep-trench milling with disk-type cutters is also being used to extract piece, granulated, and milled peat for wax production.

Significant work has been done on briquetting peat.

A great deal of attention in the republic is being devoted to questions of using peat in agriculture. In the first postwar years peat extraction for this purpose was done by the pit method employing manual labor and very simple devices. Studies by the Peat Institute substantiated a technological scheme of peat extraction for agriculture using UMPF [expansion unknown] machines and other equipment used in industry during extraction of milled peat. At the present time the extraction of peat for this purpose is mechanized. The RVT-9.5 loosener-agitator is being introduced in production to perform the technological operations of milling and agitating peat dust.

The Institute conducted unique investigations of converting poor and unproductive soils into fertile soils by applying 200-400 tons of peat with 40 percent moisture content per hectare. Soil improvement with peat improves the water-physical and agrochemical properties of soils and increases microbiological activity. The yield of agricultural crops in this case is 1.5-3 times higher for an extended period.

The republic has many lakes with reserves of sapropels suitable for industrial use. According to figures from the Peat Institute, these reserves are estimated at 2.6 billion cubic meters. Extensive studies have been made on the origin of sapropels, their classification, studying the composition and properties of lake deposits, determining areas of their use, and developing technological charts and complexes for extraction. Following instructions from directive organs, production experiments using sapropels as cement in the production of fiberboard were conducted.

Industrial production of sapropel fertilizers has begun in the republic in recent years. Industrial facilities have been built at Chervonoye Lake in Gomel Oblast and Vecher in Minsk Oblast. The technology has been developed for extracting raw material and preparing feed additives for animal husbandry in granule form.

Studies of peat chemistry are developing actively. A chemical registration of peat has been carried out and serves as the basis for determining the primary directions of thermobiochemical peat processing. The theoretical foundations and technology for thermal peat processing have been developed. A technology for gasification of peat under pressure with steam and oxygen air blasting has been tested under semifactory conditions. An industrial chart for processing peat pitch to obtain a number of products has been developed. A process for obtaining liquid fuel from peat by thermal dissolving in organic compounds has been developed and tested under industrial conditions. The theoretical foundations of obtaining carbon adsorbents, including ones with molecular-screening properties, have been worked out and a scheme formulated. A scheme for using peat as a filler in press-powder plastics has been proposed and tested in a large laboratory device on the basis of research on low-temperature thermolysis of peat.

A technology for obtaining wax from peat has been formulated on the basis of comprehensive studies of bituminous peats. New schemes have been developed and tested for receiving modified waxes, and spheres of application for them have been defined: precision casting, plastics production, to obtain anti-adhesion compounds for molding articles from polyurethane foam, and others. Reconstruction of the Dukor plant is being completed; its capacities will increase to 600 tons of wax a year using continuous-operation excavators.

11176
CSO: 1822/154

NON-NUCLEAR POWER

UDC 621.311.017.002.234:658.314.72

ECONOMIC STIMULI TO DECREASE ELECTRIC POWER NETWORK LOSSES

Moscow ELEKTRICHESKIYE STANTSII in Russian No 11, Nov 85 pp 6-9

[Article by V.D. Panin and N.P. Serov, engineers, Chelyabenergo]

[Abstract] Equations are presented for calculating losses of power in electric power transmission networks according to the 'new method' put out by the government in 1983 which, it is reported, yields an illusory reduction in the percentage of losses, practically eliminating work for true reduction in electric power losses. Even a casual analysis shows that the problem of generating a plan assignment for losses in power networks is a complex technical and moral problem. The following economic stimuli are suggested to relieve the situation: 1) establish a rigid annual plan for losses of electric power in power transmission networks: 2) establish rigid monthly and quarterly plans for such losses; 3) in case the monthly plans are not met, reserve a portion of stimulus funds awarded for power production; 4) include internal system consumption in the general plan; 5) accelerate the development and publication of a system of methods for prediction and planning of losses; 6) develop and publish basic requirements for placement of instruments to properly subdivide component losses; 7) introduce changes to conditions for awarding premiums to power system personnel; 8) publish standard works on improvement of accounting for electric power in power transmission systems; and 9) accelerate development and series production of necessary hardward. Figures 2, references 2 Russian.

6508/12640
CSO: 1822/145

NON-NUCLEAR POWER

UDC 621.31.019.3.002.235.003

EFFECTIVENESS OF INCREASING RELIABILITY OF ELECTRIC POWER

Moscow ELEKTRICHESKIYE STANTSII in Russian No 11, Nov 85, pp 9-12

[Article by V.I. Edelman, candidate of technical sciences, Ekonomtekhenergo]

[Abstract] There are currently two points of view concerning a method for determining the economic effectiveness of increasing the reliability of electric power supplies. The first requires the project be designed to achieve the same end result in terms of electric power reliability, while the second allows production of plans with different reliability results, balancing them on the basis of the calculated economic loss to power consumers resulting from the less reliable plan. Application of the two methods to planning of electrical power systems is described. Both methods should be used in electric power supply practice. The equal results method should be applied when there is a norm or the level of power supply reliability is fixed. Otherwise the method which considers the cost of losses should be used. References 4 Russian.

6508/12640
CSO: 1822/145

NON-NUCLEAR POWER

UDC 621.315.1.027.822.004.67

COSTS OF REPAIRING LIVE OVERHEAD WIRES CALCULATED

Moscow ELEKTRICHESKIYE STANTSII in Russian No 12, Dec 85 pp 57-60

[Article by V.I. Edelman, candidate of technical sciences, and S.V. Lakhov, engineer, Ekonometekhenergo]

[Abstract] It is economically costly to disconnect heavy duty transmission lines carrying 220 kV or more. Repairing these wires live, without lines disconnecting the power, thus saves large quantities of money. However, it also increases costs in that repair personnel must be specially trained, special equipment must be used and personnel must be given additional pay. Certain negative social phenomena also occur, even if personnel safety can be guaranteed. This article suggests a method for calculating the balance of costs involved in using the live wire repair method, presenting equations for computing additional costs for special training, special tools, additional pay and all the other additional cost items involved in the live wire repair method, as well as the economic advantages to be gained by improving the reliability and constancy of supply of electric power achieved.

6508/12640
CSO: 1822/143

ACHIEVEMENTS OF MOSCOW, LENINGRAD POWER SYSTEMS 1980-85

Moscow ENERGETIK in Russian No 11, Nov 85 pp 20-22

[Article by T.F. Kaberova, engineer, Energonot, under the heading, "Socialist Competition: Organization and Effectiveness": Power Workers of Moscow and Leningrad, at the Finish Line of the Five Year Plan"]

[Excerpts] The Moscow Electric Power System, being a part of the United System of the Center of the European part of the USSR, is connected with other electric power systems by means of high-voltage power transmission lines. At the same time the volume of the power demand of the electric power system comprises about 40 per cent of the demand for the entire united electric power system of the Center.

The electric power system consists of more than 50 enterprises. The established capacity of the electric power system is over 11 million kilowatts. The Moscow thermal energy system, for example, contains over 2,500 km of mainline steam pipes. On the whole, Moscow's steam heating system provides economies of 4 million tons of standard fuel per year.

Putting into effect the decisions of the 26th CPSU Congress and the subsequent CPSU Central Committee Plenums, and making extensive use of socialist competition for fulfilling and overfulfilling the planned tasks and obligations, the power workers of Moscow are successfully completing the fourth year of the 11th Five Year Plan; they have fulfilled additional social obligations in honor of the 40th Anniversary of the Victory of the Soviet people in the Great Patriotic War; and they are successfully working on fulfilling the planned tasks and obligations of the current year.

Thus, the state plan for the four years of the Five Year Plan for developing electric power was completed on 4 October 1984. During the year they saved 70,000 tons of standard fuel, which could support the operation of all the electric power stations in the systems for generating electricity for a day and a half.

The reduction in the production costs for electrical and thermal energy in 1984 amounted to 0.76 per cent, as compared with the planned amount. At the same time the reduction of expenditures for production of electrical power

amounted to 6,292,000 rubles. Of this amount, the reduction of specific consumption of fuel provided savings of 1,657,000 rubles, while decreasing the use and reducing consumption of process water for cooling the equipment amounted to 551,000 rubles. Labor productivity (the ratio of service to established capacity) for 1984 increased by 4.2 percent as compared with 1983, along with a 3.7 percent increase in established capacity.

Thus, the 13.3 percent increase in labor productivity in the electric power system outstripped the increase in established capacity. At the enterprises of the electric power system, 640,000 industrial production personnel were conditionally released for other duties, while 30 tons of automotive gasoline and 28 tons of diesel fuel, 46.5 tons of metal, and 26.6 tons of cement were saved.

The Lenergo Regional Electric Power Administration provides centralized electric and steam heating service to the consumers of Leningrad, Pskov and Novgorod Oblasts, which have a population of 9,000,000 people. There are 37 enterprises in the electric power system, including 17 electric power stations, 14 network enterprises, and a major repair enterprise.

Responding with deeds to the CPSU Central Committee's appeal for increasing work effectiveness and quality; for saving as much fuel, raw materials and supplies as possible; for increasing labor productivity by 1.0 percent above the plan and reducing production costs by 0.5 percent, the collective of the Leningrad electric power workers has successfully fulfilled its plans and socialist obligations for the four years of the five-year plan, and it is also fulfilling the assignment for the current year.

During the years of the five-year plan, they produced 91,890,000,000 kwh of electrical power, or 103.2 percent of the plan; and they put out 112,025,000 gigacalories [Gcal] of heat, or 100.9 percent.. The specific consumption of fuel for 1984 amounted to 266.9 g/(kwh) [possibly grams per kwh], as against 275.5 in 1980, which provided savings of about 580,000 tons of standard fuel.

The 2.9 percent growth in labor productivity over the four years permitted additional production output worth 54,891,000 rubles. Power systems put into operation and assimilated include two of 250,000 kwt each at the Southern TETs [Thermal Electric Power Plant], and two of 110,000 kwt each at the Northern TETs; and others. In accordance with the plan for socio-economic development, 46,929 square meters of housing was put into operation, or 111.8 percent of the plan; dining halls seating 550 people; and a dispensary with a capacity of 100 people.

In order to improve electrical power service to agricultural consumers, 10,104 km of power lines were erected of 0.4-6-10-20 kV, and 72 transformer substations with a total capacity of 478,000 kV.A [kilovolt-amperes], which permitted connecting to the network the power systems of and providing electric power service to all the newly-built agricultural projects: feedlot complexes, combines, and poultry plants. In addition, organizational-technical assistance worth 1.4 million rubles was rendered to the kolkhozes and sovkhozes.

In fulfilling the planned indicators for 1984 and increasing socialist obligations in honor of the 40th Anniversary of the Victory of the Soviet People in the Great Patriotic War, and the 50th Anniversary of the Stakhanovite Movement, the collective of Lenenergo has provided reliable and uninterrupted electrical power and heat service to the consumers, having achieved planned specific fuel expenditures for the year as a whole. Many points of the obligations were fulfilled well ahead of schedule. For example, the obligation to complete the annual plan for producing electric power by 22 December was actually fulfilled by 29 November; the introduction of a 100-GCal/h [Gigacalorie/hour] boiler at TETs-7, also planned for introduction on 22 December, was actually accomplished in the 3rd quarter of 1984.

By virtue of carrying out a complex of measures on mechanization of manual labor, introduction of NOT [Scientific Labor Organization], improving production management, and introducing collective forms of labor organization and incentive, the above-plan increase in labor productivity amounted to 8.7 percent. This was in no small degree due to the introduction of the brigade form of labor organization and incentive: in 1984, 553 people were involved in it, which is 20 percent higher than the 1983 level.

The struggle to reduce consumption of electricity for their own use at thermal power stations permitted savings of 5,000,000 kwh of electricity. By virtue of increased control over rational expenditure of electric and thermal energy per output of production unit at industrial enterprises, savings were provided against the norm of 316,000,000 kwh of electric power and 618,000 GCal of heat. Also achieved was a 0.5 percent above-plan reduction in production costs. All of these factors provided the enterprises of Leningrad and the oblast with one day's electrical and thermal power, produced by means of the fuel which was conserved.

By developing socialist competation for careful consumption of raw materials and supplies, and by economizing on fuel and energy resources, in 1984 the enterprises of the power system conserved 54 tons of rolled ferrous metals, 2 tons of rolled non-ferrous metals, 10 tons of steel pipe, 19 tons of gasoline, 5 tons of diesel fuel, and other materials. Idleness of rail cars belonging to the Ministry of Railways was reduced by 0.1 hour, which provided a saving of 3,011 car-hours.

On the basis of suggestions adopted from efficiency experts and inventions, an economic effect was achieved in the amount of 1.6 million rubles. Carrying out measures on scientific labor organization and introducing new technology provided an economic effect of 1.6 million rubles as well. Work has begun on certifying work positions, and a new planned balance of work positions has been drawn up.

In the 11th Five Year Plan, the initiatives "For Each 300 MWt [megawatt] Unit--A Calculated Specific Fuel Expenditure," "For a Five-Year Plan of Effectiveness and Quality--the Highest Operating Capacity," "Work Effectively and Qualitatively," and others, have been developed further at Lenenergo enterprises.

Additional socialist obligations were successfully carried out in honor of the 40th Anniversary of the Victory of the Soviet People in the Great Patriotic War and the 50th Anniversary of the Stakhanovite Movement. Work is being carried out on putting the full planned capacity of the second stage on-line at TETs-7, and putting into operation one of the power units at GRES-19 [State Regional Electric Power Plant],in the range of 300-390 MWt; and, assistance is being rendered to the underground railway builders in carrying out construction and installation work on cable lines.

9006
CSO: 1822/114

NON-NUCLEAR POWER

VORONEZH POWER SUPPLY IN POOR SHAPE FOR WINTER

Moscow EKONOMICHESKAYA GAZETA in Russian No 43, Oct 85 p 22

[Article by staff correspondent N. Kozlov in Voronezh, under the heading: "Get the Preparations for Winter Under Control": "Is Last Year's Situation Being Repeated?"]

[Excerpt] K. Belov, director of Voronezhenergo [Voronezh Regional Electric Power Administration] and A. Polyanskiy, director of Oblkommunenergo [probably Oblast Municipal Power Administration] are trying to forget the unpleasantness of last year's severe winter. The multiplicity of equipment breakdowns at the boiler plants at the height of the severe cold snaps, and the emergencies with the steam pipelines when entire regions of the city were without heat, have been forgotten.

They have only now begun to realize that the periods and schedules for planned equipment repair have not been met, and that the work is of poor quality--now, when the cold weather is approaching and winter is staring us in the eyes, as they say.

Here are some examples of such irresponsibility: at the Voronezh Central Thermal Electric Power Station, the repair work on power boiler No 6 is far behind schedule and no one knows when it will be finished. The situation is the very same with the restoration of boiler No 3 at the TETs substation, where work is 40 days behind schedule.

No better "prepared" for operation is the Voronezh thermal grid. The repairs on a number of boilers in the Kominternovskiy, Zheleznodorozhnyy, and Tsentralnyy Rayons are going on at a low rate. They have not prepared the equipment of the heating points and steam pipelines in the proper way.

Certain industrial sources of heating are being prepared for operation in winter conditions in just such an "energetic" manner. It's enough just to glance at the large boiler in the Sovetskiy Rayon, where the repair work is barely half-finished. There has been a delay in putting the Elektrosignal boiler association on line in the Severnyy Rayon, a residential district. Last year's situation is being repeated, when this new major district of the city was actually without heat.

More than a hundred of the heat sources are under the management of the Southeast Railroad Administration. One-third of these are still not ready for normal operation.

Incidentally, the heating systems in hundreds of buildings in the large city are not ready to accept heat. They "have not been flushed out" there, and in other localities they "have not been pressure-tested." On the whole the situation is not a happy one there, and especially in the housing areas of the Voronezhagregat Industrial Association, the industrial fabric factories, and the imeni Komintern Industrial Association for Production of Heavy Excavators.

9006
CSO: 1822/114

NON-NUCLEAR POWER

EKIBASTUZ PLANT UNABLE TO OPERATE AT FULL CAPACITY

[Editorial Report] Alma-Ata SOTSIALISTIK QAZAQSTAN in Kazakh on 17 December carries on page 1 a 900-word article by SOTSIALISTIK QAZAQSTAN reporter B. Zhanymbetov, published under the rubric "Let Us Not Fall behind One Another," entitled "Obstacles in the Way of Success." The article looks at the many reasons why Ekibastuz State Rayon Electrical Station No 1 is still operating below planned capacity, a year after the completion of installation. Singled out by Zhanymbetov as contributing to the problem are the usual difficulties of labor shortage (above all due to failure to develop worker settlement facilities to keep pace with other site buildup) and a lack of well-trained specialists in the needed areas, but also the deficiencies arising due to poor upkeep and repair of the eight energy blocks of station No 1.

Zhanymbetov suggests that repairs are being carried out irregularly, late and poorly with numerous breakdowns and inefficient operations as a result. Moreover, too much maintenance and too many repairs are necessary due to the quality of what is being done and due to installation work inadequacies and to improper use of equipment by inexperienced cadres. Much of the difficulty, Zhanymbetov suggests, can be solved by more training, but the real need is for a repair factory-base. The construction of such a base has been put off too long but he holds out no hope that it will be completed any time soon due to lack of funds and labor.

/12913
CSO: 1832/410

PIPELINE CONSTRUCTION

UDC 69.003:65.014.622.691.4

METHODS FOR BUILDING DISTRIBUTION GRIDS NEED UPDATING

Moscow PROMYSHLENNOYE STROITELSTVO in Russian No 11, Nov 85 pp 16-19

[Article by V. N. Vyatkin, candidate of economic sciences and senior scientific staff worker of the Department of Control of the National Economy of ANKh [Archives of the National Economy] under the USSR Council of Ministers, and V. N. Zinovyev, chief of the Main Regional Production-Management Administration of the Urals and Volga Region of USSR Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises]: "Methods for Improvement and Experience in Current Control of the Construction of Gas-Transport Systems"] passage rendered in all capital letters printed in boldface in source]

[Text] Further improvement of the organs and mechanisms for current planning and control of the construction of gas and oil transport arterials continues during the 11th Five-Year Plan. Experimentation in the sphere of organizing current control started back during construction of the Samotlor-Ust-Balik-Kurgan-Ufa-Almetyevsk oil pipeline (1971-1973). Organizational solutions to the creation of staff-control organs at 10th Five-Year Plan facilities indicated that they were highly effective in insuring the achievement of national economic goals. A feature of the current planning and control system that was used in 1981-1982 during construction of the Urengoy-Gryazovets-MOK [Moscow District Gas Ring], Urengoy-Petrovsk and Urengoy-Novopskovsk gas-transport arterials was the application of specific-purpose program methods for control. The organs for staff control were gradually transformed into organs for specific control of the construction of gas trunk pipeline systems.

As experience was gained, the specific systems for current planning and control were developed in terms of theory and practice. In 1980-1981, during construction of the Urengoy-Gryazovets-MOK gas pipeline, a system for collecting, processing and transmitting current data, based upon data-transmitting and computer equipment, was developed and introduced. During construction of the Urengoy-Petrovsk and Urengoy-Novopskovsk gas-pipeline system (1981-1982), an organization and a mechanism for the functioning of organs for specific-purpose planning and control were further developed. During these years a number of new standardizing documents for the specific-purpose system for current planning and control was developed and approved.

The Central Staff (Moscow), which included workers of GlavPRU [Main Production-Management Administration], the functional main administrations, client

representatives and, as a supporting link, Minneftegazstroy GIVTs [Main Computations and Data-Processing Center] worker representatives, executed general direction over the specific-purpose program for erecting gas pipelines. At all stages of construction the minister or his deputy was in charge of the central staff. Its specific purpose was the responsive solution of questions connected with insuring high-quality construction and the introduction of gas-transport systems into operation by the prescribed deadlines.

Regional staffs, which included workers of the main territorial production-management administrations (GlavterPRU's), representatives of the functional main administrations, representatives of the client and of subcontracting organizations, and representatives of local party and soviet organs, design institutes, NIPIOrgneftegazstroy [Scientific-Research and Design Institute of the State Trust for Industrializing the Construction of Gas and Oil Enterprises] or Orgtekhstroys [State Trusts for Industrializing Construction], and representatives of communications entities and the computing centers (the GIVTs and KIVTs's [satellite computations and data-processing centers] were established at each region).

At the area construction level, a special staff also was created, which was formed by workers from the staffs of the main production and functional administrations, the client, subcontracting organizations, communications enterprises and local organs of authority. The staff supervisors were designated by orders of the construction ministries and the client. The staffs coordinate operations and responsively solve problems connected with insuring the construction and introduction into operation of a portion of a gas trunk pipeline, including the compressor stations, within a given area.

A central control and information point is created at each specialized flowline construction group, from the resources of the appropriate trust. Also created are staffs for the accelerated construction of gas-transport systems under the CPSU committee of the 26 oblasts over whose territory these systems will pass.

The experience gained in recent years in controlling the construction of oil and gas facilities, which are unprecedented in scale, has taught flexibility of structure in transitioning from one stage into another, with interdependence in the use of branch and territorial principles of control. In our view, the experience in staff and territorial control gained by Minneftegazstroy is of considerable interest, but many problems remain to be solved.

It should be noted primarily that the necessary unity of all control organs--staffs and functional control organs, from the flowline construction group level to the ministry level--has not always been achieved. The system for analyzing progress in construction and the preparation of solutions for deviations has not been realized fully. The information on work progress does not always portray accurately the causes of the lags that have occurred, and information about the steps taken to eliminate deviations and, sometimes, descriptions of the meteorological conditions for the construction work are absent. The equipmental base for the current-control system is in an unsatisfactory state. The existing communications lines do not always fully meet the needs for this service. There is not enough equipment for completely

outfitting regional and area construction staffs. The computer equipment is not used effectively enough. Technical resources have been dispersed throughout various organizations, hampering the creation and operation of a unified equipment base for the control system.

Even such a general list of unsolved problems indicates that a substantial portion of the difficulties of control during the erection of trunk pipelines are connected with the stages of site preparation and current control over work progress. The system for current planning and control of pipeline construction should be viewed as a specific-purpose system that is called upon to insure the integrated erection of a gas-transport system by the prescribed deadline, with the efficient use of all types of resources and with high quality of the final product. The system should provide for the efficient solution of control tasks at all stages: the organizational, preparatory, basic-operations and completion stages.

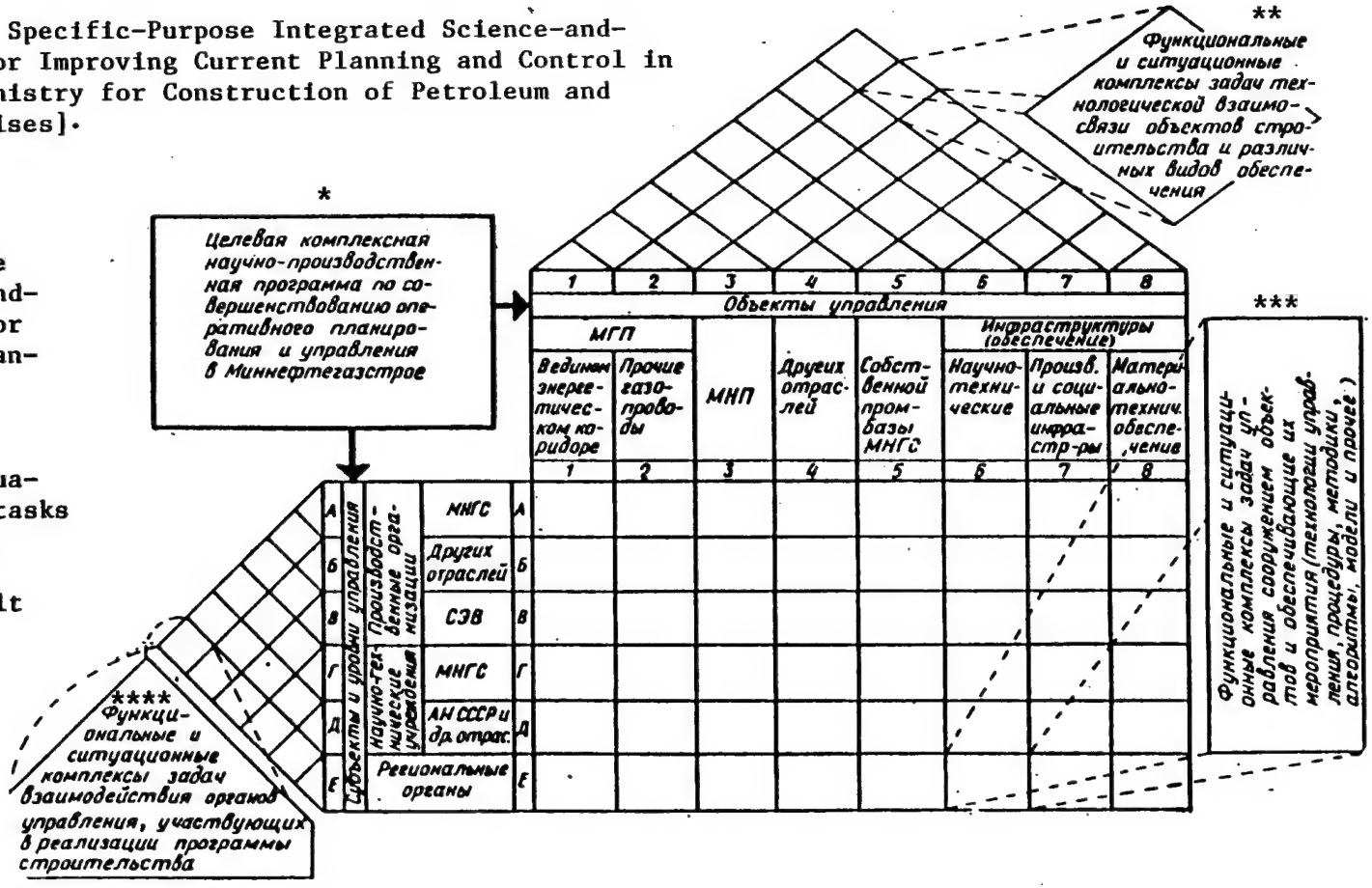
A specific-purpose integrated science-and-production program that considers past trunk-pipelinebuiling experience (see the figure) was developed for the organization and functioning of a specific-purpose system for current planning and control of construction of the Urengoy-Pomary-Uzhgorod gas pipeline. A large number of branches of the national economy and of the country's industrial enterprises take part in building gas trunk pipelines. This requires the coordination of operations at the interbranch and interregional levels. The participation of CEMA-member nations in erecting the country's arterials also poses the control system with problems of realizing international policy. Problems of this nature arose in various degrees at various construction projects in previous years, but for the first time they are being solved right at one construction job.

Accordingly, the specific-purpose integrated program called for the coordinated solution of functional management tasks of three classes: operational, production control and coordination. All these complexes of tasks were resolved by the special specific-purpose system for current planning and control that was formed during the period of the erection of a gas pipeline, based upon the existing organs for traditional control (the ministry's staff, main production administrations, trusts and construction administrations). It has four levels of control: the construction project as a whole, the construction region, the construction area, and the construction section.

The following were developed within the framework of this system: a special-purpose prescriptive schedule for constructing the linear portion and for erecting navigable-stream crossings and compressor stations; the monthly plan-schedule for performing the work; and the weekly and daily tasks. The specific-purpose prescriptive schedule is the basis for development of the monthly work-performance plan-schedules of the main production administrations, associations, general-contracting trusts and flowline operating groups. The calculation and revision of monthly schedules is accomplished by subunits of the GlavPRU, the GlavterPRU and Minneftegazstroy's GIVTs, based upon the carryovers of work at the start of the plan period and the deadlines for completing construction of the facility.

The initiative for establishing weekly and daily tasks belongs completely to the flowline operating groups. They submit and defend their proposals.

The Structure of the Specific-Purpose Integrated Science-and-Production Program for Improving Current Planning and Control in Minneftegazstroy [Ministry for Construction of Petroleum and Gas Industry Enterprises].



Key:

*The specific-purpose integrated science-and-production program for improving current planning and control in Minneftegazprom.

**Functional and situational complexes of tasks for mutual operating relationships of the facilities being built and of the various types of support.

***Functional and situational complexes of tasks for controlling the erection of facilities and the measures that support these tasks (control technologies, procedures, methodics, algorithms, models, and so on).

****Functional and situational complexes of tasks on the mutual relationships of the control organs that participate in realization of the construction program.

[Key continued on next page.]

[Key to figure, continued]

1-8. Objects of control:
1-2. MGP's [gas trunk pipelines]:
1. In a single power corridor.
2. Other gas pipelines.
3. MNP [oil trunk pipelines].
4. Other branches of the economy.
5. Minneftegazstroy's own program.
6-8. Infrastructures (support):
6. Scientific and technical.
7. Production and social.
8. The supplying of materials and equipment.

A-E. Subjects and levels of control.
A-B. Production organizations:
A. MNGS [Ministry of Construction of Petroleum and Gas Industry Enterprises].
Б. Other branches.
B. SEV [CEMA--Council for Economic Mutual Assistance].
Г-Д. Scientific and technical institutions:
Г. Of MNGS.
Д. Of AN SSSR [USSR Academy of Sciences] and other branches.
E. Regional organs.

After concurrence and generalization, the weekly and daily plans for the trust and for the main administration as a whole are sent to the Central Staff for the management of the construction. Finally, they are coordinated and confirmed at a teleconference for the construction project as a whole.

Informational support for organs of the specific-purpose system for current planning and control is carried out in the daily, weekly and monthly cycles of the system's functioning.

Primary and special current information is transmitted through the flowline group's central data-control point (IDP) to the central data-control point of the construction area staff and to the trust. The construction area staff generalizes the data and transmits them to the GIVTs central control section, to the appropriate main administrations, and to the region's GlavterPRU. The information processed in the GIVTs is sent to the Central Staff for management of the construction. The managerial decisions adopted at the Central Staff level are brought to those who are to execute them.

The main territorial production-management administrations (GlavterPRU's) which provide for the territorial and branch aspects of current control have now been created and are functioning successfully in certain construction ministries (Minmontazhspetsstroy [Ministry of Installation and Special Construction Work], for example). Thus, in the Tatar ASSR, the GlavterPRU of Minmontazhspetsstroy in the city of Brezhnev is engaged in coordinating the activity of ministry organizations that work on the erection of Kama Motor-Vehicle Association plants. It is under the main administration chief, who is a member of the ministry's board and a deputy to the Tatar ASSR Supreme Soviet. Subordinated to this main administration are integrated sections for the Kazan and Nizhnekamsk zones, which are under the deputy main administration chiefs.

A GlavterPRU was organized at Tyumen in 1978 to coordinate Minneftegazstroy organization operations for the creation of the West Siberian Fuel Complex. In 1981 a main territorial production-management administration for

coordinating the activity of the Minneftegazstroy organizations and enterprises that are building trunk pipelines in the Urals and Volga region was established at Kazan. At present, 8 main administrations and associations and more than 40 trusts and 100 construction-and-installing subunits with an annual program of about 1.2 billion rubles for construction and installing operations are at work in its area of activity. The jobs are located in 26 of the country's oblasts and autonomous republics. The GlavterPRU's organizational structure enabled its services to the facilities being erected to be brought close to it, since the production sections are situated in the cities of Sverdlovsk and Perm.

Three years of operating experience have indicated the viability of such an organizational structure and, at the end of 1983, an additional production section was created at Gorkiy. All GlavterPRU sections have equipment for receiving and transmitting data (TAP-34 teletypes) and other means of communications. The main tasks of GlavterPRU (Kazan) are: coordination of the activity of Minneftegazstroy organizations and enterprises that are building trunk pipelines in the Urals and Volga regions; coordination of the work of various outside organizations which have been involved in the construction of compressor stations and other oil and gas industry facilities; monitoring the construction and introduction into operation of production facilities in unison with facilities for the infrastructure and for cultural and domestic-amenity purposes; maximum use of the outfitted-module method for manufacturing and installing the operating equipment and for erecting buildings from structures completely readied at the factory; the development, jointly with the main territorial administrations and ministry sections, of measures for the timely and high-quality introduction into operation of trunk pipelines in the Urals and Volga region; the preparation of proposals for the ministry on the redeployment of resources with a view to concentrating them at the sections that are decisive for the construction of trunk pipelines, and also on the improvement of construction-operations control and on current planning and improvement of the work of construction and installing organizations; and the monitoring and systematic submission of information to the ministry about the main administrations' and associations' fulfillment of the appropriate decrees and orders of the USSR Government and orders and regulations of the ministry.

Let us examine GlavterPRU operation in the example of control of the construction of the 529-km section of the Kholmogory-Klin oil trunk pipeline, which was erected in the first half of 1984 on Sverdlovsk and Perm oblast land by Glavvostoktruboprovodstroy [Main Administration for the Construction of Pipelines in the Eastern Regions organizations].

A staff for the region was created in Perm, based upon the production section of the GlavterPRU, under the chief of the GlavterPRU and Glavvostoktruboprovodstroy, which included representatives of the client, the design institute, subcontracting organizations and communicators. Staffs were created at the sections of each of the six trusts, headed by the trust supervisor, with a representative of the client and of the people who do the work, and also a representative of the region staff--a GlavterPRU worker, who followed up on the authenticity of the information that came to the region staff from the field.

The region's staff provided for the control of oil-pipeline construction progress. Control tasks were established by type of work, with breakdown by the month, week and day for each trust. Work results were summed up each day at teleconferences. In case of a lag behind the contemplated goals, additional measures were taken, depending upon the circumstances. Much attention was paid to flexible current control over both the construction itself and the preparation for construction work. Crossings of natural obstacles were prepared in advance, constructional structure and outfitted-module arrangements were manufactured at construction-organization bases and sent to the job, and operations were combined by type and by performer. Bonuses were paid for the fulfillment of established tasks. As a result of purposeful work, the oil pipeline was put into operation by the established deadlines.

Many problems arise during the erection of pipeline-distribution networks. In order to get to the customer, petroleum product and gas arrive in pipeline distribution networks (TRS's), which are of great length and small pipeline diameter, are spread over a large territory, have a small concentration of construction and installing work volume, and sometimes are located at a great distance from construction-organization bases and from the housing of construction-worker collectives. Reliability in putting TRS's into operation by the prescribed deadlines still has not been attained, and the reserves that construction organizations have still are not being used completely.

Let us examine this question in the example of the work of Uralneftegazstroy (UNGS) [Trust for the Construction of Oil and Gas Enterprises in the Urals Region] of Glavvostoktruboprovodstroy. UNGS is a specialized construction and installing organization which is occupied mainly in the erection of trunk pipelines in the Middle and Southern Urals. The trust is steadily meeting the established plan for construction and installing work volume and increases its program from year to year, but the plan for pipeline distribution networks--gas-pipeline branches and petroleum-product pipelines--regularly is not being met.

The trust has been assigned to a single section for gas trunk pipelines. As soon as it finishes work on one gas pipeline, the resources freed are plugged into the erection of a parallel strand of gas pipeline, practically without redeployment. Freight comes to the very same railroad yards. The housing settlements and construction-organization bases are fixed. The amount of construction and installing work on each individual strand of gas pipeline 1,420 mm in diameter is two-thirds of the annual amount of work done by the trust. The trust's staff and its construction subunits pay special attention to these facilities. One of the trust's chief supervisors is engaged in coordinating work on the route.

Practically the same subunits that build the trunk pipelines also participate in construction of the distribution networks (and their trust worked on 12 facilities during 1982-1984). These small facilities require larger specific expenditures of live labor, and the work indicators are much lower than for the trunk lines. Supervision of the work is charged to a general-contracting administration, while specialized trust organizations take part in erecting the distribution networks. One welds pipelines, another digs the ditches, a third insulates and lays the pipe in the ditch. Controversial questions that arise at the jobs can be resolved only through the trust. The trust's

managers do not have time for such trifles. Preparation for construction operations is transferred to construction administrations and is performed tardily and on a low level.

This is how even trunk pipelines were built previously. Organizations at the trust level were specialized by type of work. Experience in the construction of the largest oil and gas pipelines indicated a need to integrate the construction of arterials at the trust level. At the end of the 10th and the start of the 11th Five-Year Plans, Minneftegazstroy created integrated pipeline construction trusts. The steady introduction of gas trunk piplines from West Siberia to the country's Central Economic Region during the 11th Five-Year Plan, with a substantial reduction in the prescribed construction periods, proved to be an advantage of the integrated organization of construction. No one has any doubt now that the integrated trusts, as a new organizational structure, have proved themselves well; this still cannot be said about erection of the distribution networks.

It has now become necessary for the trust to create an integrated construction and installing administration for erecting pipeline distribution networks (KSMUST's) made of pipe less than 1,020 mm in diameter, equipping it under the annual program with the necessary welding, earthmoving and pipe-insulating and pipelaying equipment. Subcontracting organizations can be charged with executing special operations, electrochemical protection and KIP [control and measuring instruments] operations. The technical and economic indicators for these administrations will be established on the basis of the fulfillment of the construction and installing operations on TRS's alone, and the concept of "profitable" and "unprofitable" work will disappear.

The KSMUST can be specialized by section and have the required number of flowline operating groups. All questions on pipeline erection will be resolved at the KSMUST supervisor level. It will be much simpler to establish the flowline principle of construction, to prepare at all levels for construction operations, to have long-range planning and a more rhythmic workload, to use favorable seasons for doing the swampy sections, to erect crossings across water obstacles, highways and railroads ahead of time, and to build outfitted-module surface structures ahead of time.

Thus, in summing up the results, it should be noted that the system of measures for improving the current control of construction should consider the following ideas on theoretical procedure: first, the requirements for current control possess considerable specificity, depending upon the level of the management hierarchy, the priority, magnitude and type of facility being erected, the territorial layout and length of the oil and gas transporting system, and the punctuality and quality of realization of the various stages of construction; and second, rapid development of the technology for doing construction work and the requirement for accelerating the construction pace, which have no precedent, necessitate a search for basically new organizational forms, an experimental check of them, and rapid replacement by them of the traditional forms.

An analysis of modern practice and of the urgent problems of current control of the construction of oil and gas facilities enables the following measures to be proposed for improving the organization of control:

1. With a view to further improving the functioning of the specific-purpose system for current planning and control, it is necessary to develop a specific-purpose integrated program for further improving the system for current control of the branch's construction operations on the basis of monthly, weekly and daily schedules, using electronic-computer and microprocessor equipment, and to improve the system for collecting, processing and transmitting information from the job to the control staff.

2. It is necessary to conduct research, within the framework of development of the specific-purpose integrated program for further improving the system for current control of the branch's construction operations, on current-control methods in a centralized-planning environment and to work out a new procedure for assigning rights and resposibilities for control organs at various levels that will provide for a harmonious transition of construction organization from the site-preparation stage to the stage of erecting the oil and gas facilities.

3. The experience of Minneftegazstroy's GlavterPRU in the coordinational activity of controlling construction operations has enabled the conclusion to be drawn that it is desirable to study the possibility of propagating this organization of current control of construction of the most important facilities to certain other parts of the country (for example, to areas of the Ukraine, Belorussia, the Baltic, and the Union republics of Central Asia).

4. An analysis of the erection in recent years of pipeline distribution networks less than 1020 mm in diameter has indicated that the existing structure of integrated pipeline construction trusts does not come up fully to the modern level of current control in regard to the timely introduction of the networks into operation. It seems to us that it is necessary to examine the desirability of creating within the integrated pipeline trusts integrated construction and installing administrations to erect pipelines less than 1020 mm in diameter, this construciton of pipelines to be accomplished by integrated sections that combine all the basic types of operation.

5. Refinement of the rights and obligations of structural subunits of the new type apparently will require the conduct of economic experiments, development of the programs for which should be charged to branch NII's [scientific-research institutes].

RESEARCH AND EXPERIENCE IN CONTROL IS PERSUASIVE OF THE DESIRABILITY FOR A DEEPER SYSTEMS-TYPE STUDY OF THE ORGANIZATIONAL AND MANAGEMENT PROBLEMS OF SITE PREPARATION AND COORDINATION OF THE PREPARATION STAGE WITH THE STAGE OF CURRENT CONTROL OF OIL AND GAS CONSTRUCTION. Minneftegazstroy's experience can be useful also for other branches that do construction work. And, finally, it seems to us, experiments should continue in the sphere of improving the current control of oil and gas construction, for which new theoretical management research is required.

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ENERGY CONSERVATION

LITHUANIAN OFFICIAL DETAILS USE OF OIL PRODUCTS

Moscow NEFTYANIK in Russian No 12, Dec 85 pp 4-6

[Article by I. Lanyauskas, chairman of the LiSSR State Committee for Petroleum Products, under the rubric "Put the Decisions of the CPSU into Practice": "Using Petroleum Products More Efficiently in the LiSSR Economy"]

[Text] The Soviet Union is the only industrially developed state in the world which has, throughout its existence, developed its economy on the basis of its own fuel and energy resources. The difficulties experienced by the country's economy in this area have been chiefly difficulties related to the fact that almost 80 percent of the country's energy resources are located in the East, but they are mainly consumed in the European part. The importance of rational use of fuel and lubricants has increased in connection with growth in the consumption of oil and petroleum products and the increased cost of extracting and transporting oil.

The question of rational use of petroleum products is especially timely in our republic because of our high level of consumption and remoteness from the sites where oil is extracted.

The LiSSR Goskomnefteprodukt [Lithuanian SSR State Committee for Petroleum Products], carrying out the decree of the CPSU Central Committee and USSR Council of Ministers entitled "Raising the Efficiency of Use of Means of Motor Vehicle Transportation in the Economy, Intensifying the Struggle against False Reporting in Motor Vehicle Shipping, and Insuring Preservation of Fuel and Lubricants," has worked out and is implementing a comprehensive plan to create stable conditions for insuring the preservation of fuels and lubricants at enterprises that deliver oil products and at filling stations in the republic.

In conformity with this plan we have worked out and introduced more than 20 normative, instructional, and methodological statutes aimed at bolstering monitoring and increasing the accountability of personnel for insuring the preservation of oil products.

The program for technical re-equipping of enterprises and filling stations is being carried out purposefully. At four enterprises Luegmans local-controlled filling gauges (50 units) have been introduced; they make it possible to prevent overfilling tanker trucks and monitor the amount of gas pumped. At the

initiative of the Committee back-up monitoring gauges were designed and installed on filling station gas pumps, and 170 old-type pumps were equipped with remote zero-clearing units. The filling stations are being technically re-equipped with more progressive gas pumps.

An automated system for managing supply of petroleum products, called "LiSSR ASUnefteprodukt," has been developed and is being introduced. Twenty-one tasks to mechanize accounting have been introduced at 9 subordinate enterprises using leased computers from the republic Central Statistical Administration; they are now being expanded. This year the Kaunas Oil Products Delivery Enterprise began building automated control systems for the technological processes of receiving, storing, and delivering fuel and lubricants (an enterprise control system for technological processes), which will make it possible to eliminate human participation in measuring and determining the weight, density, and other parameters of petroleum products. Development of technical documentation for the enterprise control system at the Utena enterprise is being completed, and at the Klaipeda enterprise it is in the development stage.

The assortment of petroleum products has been significantly enlarged in recent years. The enterprises to deliver petroleum products were mostly built 15-40 years ago and cannot insure individual receiving, storage, and delivery of such a broad assortment of fuels and lubricants as is needed today because of the increase in the number of grades of fuel and motor vehicles. In the last five-year plan 18.4 kilometers of pipeline and 41,200 cubic meters of tank capacity were built. The technological procedures for receiving and delivering petroleum products were updated.

Physical facilities for monitoring have been bolstered to maintain the quality of oil products in the system. All 12 enterprises have laboratories for analyses, and there are five UIT-65 units to monitor the octane number of gasolines (at the start of the five-year plan there was just one). Three more such units are to appear this year. Scheduled preventive maintenance work on equipment is being done better and the timetables established by GOST 1510-76 for cleaning tanks are being followed, which has a significant impact on maintaining the quality of oil products.

Whereas 104 tons of excesses of other grades had to be taken to cover shortages of oil products in 1983, in 1984 the figure was just 1.4 tons. All shortages over the established norms of natural loss are related to the responsible persons and they are charged for them in the legally mandated procedure.

The committee is constantly tightening its monitoring of observance of procedures for receiving, storage, and delivering oil products. In 1983 errors in measurement of the volume of petroleum products were abolished for this reason; at enterprises inspected by the People's Control Committee these errors were 30-35 tons above or below for A-76 gasoline alone. We watch closely to see that shortages within the norms of natural loss are written off only where there is in fact a shortage. For tank farm storage of gasoline the norm of natural loss in 1984, for example, was 1,106 tons. In fact 661 tons worth more than 180,000 rubles were written off, which was within the norm (445 tons of the norm were not used).

For receiving gasoline by rail the norm of natural loss was 238 tons, while actual losses en route were 173 tons or 72.7 percent of the norm.

All this inclines the persons responsible for preservation of commodity-material assets to some degree to establish reserves stocks (conceal when receiving gas from tanker cars) in order to avoid above-norm shortages, which are charged to the materially responsible persons immediately after they occur.

During planned and unplanned inventories of materially responsible persons in 1984, 6,887 tons of excess oil products were entered as income, including 664 tons of gasoline worth 298,000 rubles.

During inventory today excess oil products are evaluated just like shortages as a flagrant violation of preservation of socialist property with all the consequences that follow from that.

A great deal of explanatory work in being done in the republic with consumers of petroleum products. In 1982 the LiSSR Goskomnefteprodukt worked out and the Republic Interdepartmental Commission on economy and rational use of material resources ratified the "Recommendations on Development of Plans of Organizational-Technical Measures to Save Fuel and Lubricants." These recommendations are now used widely by associations, enterprises, and organizations in the republic.

Work on prudent use of oil products is being done in a planned and skillful manner at the Kolkhoz imeni Kirov in Shalchininskiy Rayon. The petroleum storage facilities there are in good condition. Maintenance schedules for means of transportation are followed. The maintenance point has oil pumps and the necessary stands to regulate fuel equipment, which makes it possible to avoid fuel losses from operating malfunctioning means of transportation. The kolkhoz writes a plan of organizational-technical measures to conserve oil products by the start of the year. Each point of the plan is carefully thought out and specific and reflects possible sources of losses of petroleum products. A specific person is responsible for performance of each measure at the established time. A commission to analyze expenditure of fuel and lubricants, headed by the chief engineer, constantly monitors performance of the given assignments.

Means of transport are refueled using gas pumps in good working order. It is not permitted to mix different petroleum products. The kolkhoz has organized norm-setting and recordkeeping for oil products intelligently, and does not permit them to be expended or written off without norms. Each means of transportation has a limit card (fuel log) on whose basis fuel and lubricants are released to the particular vehicle during the month. The kolkhoz has organized collection of used petroleum products well and introduced a bonus system for saving oil products and material accountability for overexpenditure of them, which stimulates savings of oil products. The results have not been slow to show themselves -- oil products are used rationally and the set assignments for conservation are always fulfilled.

The LiSSR Ministry of Communications has accumulated useful experience in work on economical use of oil products. They have established precise monitoring

of the development and implementation by subordinate enterprises and organizations of plans of organizational-technical measures that insure complete fulfillment of assignments for conserving oil products. A manual of rules has been developed for the people who make the inspection. Constant checks of correct use of norms for expenditure of liquid fuel have been established. In just the first half of 1985 443 tons of motor vehicle fuel was saved.

The LiSSR Ministry of Communications has several independent, economically accountable departmental motor pools. One of them in the vehicle depot in Vilnius, which has six vehicle columns subordinate to it (two in Vilnius and one each in Kaunas, Klaipeda, Shauliai, and Panevezhis). It chiefly insures the shipping and delivery of printed matter, mail, and telegrams. The depot has means of transportation, modern repair and monitoring equipment, and skilled personnel.

To improve work on conserving fuel and lubricants, each year the vehicle depot reviews gasoline consumption norms for each brand of vehicle, for columns, and for the depot as a whole.

Fuel limits for all columns and the base as a whole have been established on the basis of the average norm of gasoline consumption per vehicle, the average vehicle fleet, and the coefficient of fleet use. Corresponding gasoline limits were set for leased vehicles. These steps secured a savings of 193.5 tons of gasoline in 1984-1985.

The postal administration, the division of mechanization and transportation of the LiSSR Ministry of Communications, and the vehicle depot envisioned a series of routes for the purposes of saving fuel, reducing unproductive parallel trips by vehicles and overtime work by drivers, and improving the delivery of printed materials. The reduction of just one route for delivery of official mail to Vilnius (from four to three routes) makes it possible to save 50 tons of gasoline a year.

Exact determination of distances and a precise schedule of vehicle traffic make it possible to figure the needed amount of gasoline and to prevent burning too much.

The plan of organizational-technical measures envisions that all motor pools will build filling stations and points. This will make it possible to eliminate empty refueling runs by vehicles and save many thousands of liters of gasoline.

A special commission headed by the deputy head of the motor pool regularly checks the condition of speedometers, investigates causes of damage to them, and takes steps to eliminate problems discovered. Once a quarter the commission must inspect all motor vehicles carried on the depot's balance.

Regular checks are made of fulfillment of work volumes by various customers and suprise inspections are made to check on efficient use of means of transportation by clients. Cases of false reporting of vehicle working time are investigated and the guilt parties are punished.

The vehicle depot devoted a great deal of attention to training drivers and other workers involved with servicing means of transportation. As calculations show, low driver qualifications, and thus incompetent driving of a truck, lead to an annual loss of 0.6 tons of gasoline per person. And on the other hand, raising the qualifications of 30 drivers mades it possible to save up to 15 tons of gasoline a year or 0.5 tons per person. Therefore the section of the collective contract concerned with raising qualifications, economic knowledge, and general educational level of employees specifically states how many drivers should go through retraining.

To concentrate trucks and insure proper checks on rational use of fuel the LiSSR Ministry of Agriculture has established a vehicle transportation production association, which comprises 5 vehicle transportation enterprises with more than 700 trucks. The vehicle transportation enterprise (which is based in Kaunas) will ship more than 4.5 million tons of freight, which is almost 70 percent of the Ministry's freight traffic.

In conformity with the plan for full mechanization and automation of construction and installation work assignments are planned each year for centralized deliveries of freight from shippers directly to the construction sites, bypassing trips to warehouses. More than 30 rational through routes have been worked out and enterprises and organizations use them to ship more than 370,000 tons of freight each year. The use coefficient of travel on these routes is 0.7-0.9. Container and stack shipping is being introduced successfully, making it possible to reduce vehicle downtime for loading and unloading. The enterprises and organizations of the ministry are successfully using the method of shipping concrete and mortar by hourly schedules and the brigade contract.

A table of distances between enterprises of the rayon selkhoztekhnika enterprises has been developed and ratified by order for the purpose of eliminating false reporting of milage; for their part, the enterprises have obligated themselves to ratify by established procedures tables of distances to kolkhozes, sovkhozes, and other agricultural organizations in the rayon and to the brigades, livestock units, and storehouses from the center of each farm. This same order envisions steps to increase rational use of special cars, strengthen monitoring of speedometers, eliminate above-norm truck downtime for loading and unloading, and the like.

We should take note of the purposeful work of the LiSSR Ministry of Vehicle Roads and Highways, which has formed divisions for repair and servicing of fuel equipment and vehicle diagnosis points. The number of vehicle-positions for engine warming in the winter period has been increased.

Considerable attention is being given to the condition of speedometers and monitoring air pressure in tires.

In just the first six months of 1985 14,700 tons of standard fuel was conserved by improving the technical servicing and repair of motor vehicles.

This ministry is doing a great deal of work to raise the qualifications of drivers. In the period from 1981 to 1984, 14,520 drivers raised their qualifications and 7,587 new specialists were trained.

Each year a survey is made and unprofitable bus routes are closed. Rational schedules of bus traffic are compiled by computer. Questions of conserving oil products are discussed twice a month at selector conferences of motor vehicle enterprise managers and reports on these matters are given at joint sessions of the collegium of the Ministry of Vehicle Roads and Highways and the republic Goskomnefteprodukt.

More than 70 percent of the rolling stock that transports freight in intercity communication works on schedules and rational through routes. The proportion of diesel engines in the fleet is increasing.

Thanks to the measures taken, in 1984 the republic as a whole conserved 17,300 tons of gasoline, 36,200 tons of diesel fuel, and 131,800 tons of furnace fuel.

The main lines of work to increase the efficient use of petroleum products in our republic are as follows:

-- further improvement in the technical condition of equipment, machinery, and fuel distribution devices, and refinement of the criteria for evaluating its work from the standpoint of rational use of petroleum products;

-- use of equipment with the maximum efficiency rating and continued improvements in equipment design during its use;

-- rationalization of freight shipping;

-- bringing vehicle filling stations closer to the permanent bases;

-- correct and rational selection of the speed of means of transportation and the working mode of machinery, and rational use of the inertial force of the moving equipment;

-- rational consumption of petroleum products during the winter (reducing consumption to heat internal combustion engines, use of warm air, sealing and insulating interior spaces, correct temperature regulation and maintenance, and the like);

-- improving the condition of petroleum storage facilities to reduce losses from evaporation, overflows, spoilage, and mixing petroleum products;

-- improving the training and increasing the qualifications of personnel (drivers, machine operators, other operators, equipment and fuel device repairmen, and other employees involved in the processes of transporting, storing, receiving, distributing, and consuming petroleum products).

Further improvement in rational consumption of petroleum products demands improvement of the management mechanism. First of all we must strengthen material and

disciplinary responsibilty of officials for rational use of petroleum products, making rewards for the primary results of activity directly dependent on the results of rational use of petroleum products.

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ENERGY CONSERVATION

IMPROVING EFFICIENCY OF FUEL USE IN MOSCOW POWER SYSTEM

Moscow ENERGETIK in Russian No 11, Nov 85 pp 11-13

[Article by A. P. Aleksanov, deputy administrator of Mosenergo Regional Power Administration: "Effort to Improve Fuel Use in the Moscow Power System"]

[Excerpts] At the beginning of 1985, TETs capacity represented about 70 percent of the installed generating capacity of the Moscow Power System [Mosenergo]. About 70 percent of the electricity is cogenerated in district-heating cycles, thus ensuring a low specific fuel consumption for electricity generation. In 1984, this indicator for the entire power system was 261.3 g/kWh, while it was 226.4 g/kWh for Moscow TETs's.

For many years the Mosenergo collective has been consistently and determinedly striving for better fuel use. From 1963 through 1983, the specific fuel consumption dropped from 364.2 to 262.9 g/kWh.

The basis for improving the efficiency of power-system operation is the implementation of the largest, most efficient available district-heating generating units with T-250/300-240 turbines at both new and expanded power plants. The share of electricity generated by these units increased from 29 to 44 percent during the 10th Five-Year plan and reached 49.4 percent by 1984. More of these generating units are to be installed during the 12th Five-Year Plan.

The increasing level of district heating in Moscow is providing a continual reduction in specific fuel consumption.

While increasing the capacity of its generating sources, Mosenergo is constantly monitoring the proportion of heat-generating capacity. To compensate for unfavorable trends of reduced proportion of district heating and poorer fuel use, Mosenergo has switched the summer heating loads from boiler plants of the Mossovet Ispolkom Fuel-Energy Administration to Mosenergo TETs's. Over the last 3 years, the construction of additional pipe connections has made it possible to increase the TETs load from 200 to 600 Gcal/h, which made it possible to save almost 35,000 tons of standard fuel during the summer period of 1984.

During the 10th Five-Year Plan, the specific fuel consumption was reduced by 17 g/kWh, from 282 to 264.9 g/kWh, while the specific fuel consumption

for condensing operation was reduced by 24 g/kWh, from 399 to 375 g/kWh. The specific output of electricity cogenerated in district-heating cycles per Gcal of generated heat increased by 44 kWh/Gcal, resulting in the production of an additional 2 billion kWh of electricity.

During the current five-year plan, the rate of reduction in specific consumptions slowed sharply. Over 4 years, the absolute reduction in specific consumption totaled only 3.6 g/kWh, and for the entire five-year plan it is expected to be not greater than 4.5-5 g/kWh. This slowdown is due to the reduction in the growth of heat consumption, above all by the industrial sector. The limitation on the growth of industrial enterprises in the capital and the energy-conservation policy have led to a situation where in the current five-year plan, the annual number of new heating hookups has dropped to almost one half the previous level.

The proportion of electricity cogenerated in district-heating cycles over the 4 years of the current five-year plan dropped by 0.7 percent and reached 50.8 percent in 1984.

In 1981 and 1982 the proportion of cogenerated electricity dropped faster than the condensing generation of electricity increased, resulting in higher specific fuel consumption. Therefore, Mosenergo began to take more persistent measures to improve the primary operating technico-economic indicators (TEI) of power-plant equipment.

In recent years, constant efforts to improve the quality of repair, implement brigade forms of organization and provide incentives for repair-shop workers have established a stable trend of increasing primary TEI's for boilers and turbine units.

In power-plant operations, besides efforts to strengthen production and technological discipline, special attention is being given to implementing ASU TP's [plant technical management automation systems] and to a new approach to the bonus system for operating personnel. For example, at TETs-21, the use of an ASU TP for analyzing the efficiency of equipment operating conditions has made it possible to evaluate whether the personnel on each shift are conserving or wasting fuel. The ASU TP data are being successfully used in organizing socialist competition of operating personnel in boiler-turbine shops.

Mosenergo has been giving great attention to reconstruction work as a means to raise equipment efficiency. In 1984, ninety-five such measures were taken at 10 electric power plants and in the Heating Network. Because of this, savings of standard fuel totaled 36,700 tons, while the specific fuel consumption for the entire power system was reduced by 0.6 g/kWh. This year, 136 measures are to be taken, with a planned savings of about 60,000 tons of standard fuel.

The plans for 1985 include special attention to reducing the energy consumption for in-plant auxiliary needs. At our electric power plants, 9-10 percent of the electrical and thermal energy is consumed in-plant. An analysis of TES operation shows that collectives are not paying sufficient attention to raising the efficiency of in-plant auxiliary mechanisms,

particularly when changing output to meet load changes and during deep load reductions at night. Various methods of regulating the output of mechanisms, such as adjustable electric drives, improved guide vanes for forced-draft fans etc., are not being widely used.

In connection with this, the following measures are to be carried out at TES's:

realizing the recommendations of project, scientific-research and adjustment organizations to: 1) improve the tightness of gas ducts in boilers and coal-pulverizing systems, 2) reduce the air leakage through seals of regenerative air heaters and 3) equip boilers with means of maintaining clean heating surfaces;

reducing the hydraulic resistance of feedwater and condensing lines, water-circulation systems and heating systems of hot-water boilers in district-heating circuits and

bringing the head characteristics of feedwater, condensate, drain, circulation and network pumps into conformance with the piping characteristics; optimizing the operating conditions and using economical means of regulating pump output.

By the end of 1986, the in-plant auxiliary mechanisms of all TES's in the power system will be studied and tested, and recommendations will be given on reducing the electricity consumptions of these mechanisms. Electricity-consumption norms for forced-draft fans, coal-pulverizing systems and circulation systems will be determined more precisely.

A method for periodic rapid testing of boilers and turbines using standard instruments and MEI [Moscow Power Institute] flow meters will be improved and implemented. This will provide for quick monitoring of: 1) TEI's, by computer, and 2) the degree of tube-bank fouling in condensers and network heaters.

For monitoring and optimizing the operation of in-plant auxiliary mechanisms at TES's, an IIES [information-measurement system of electricity accounting] is being implemented. This system is also being included in the projects for expanded and new Mosenergo electric power plants.

Of primary importance in organizing efforts to reduce specific fuel consumption is the improvement of the indicator planning system, since only realistic plan indicators permit collectives to be mobilized for specific tasks. In this regard, a method of planning and plan refinement for the heat output of TES's and the Mosenergo system was developed in 1984 and implemented in 1985. A method of planning and plan refinement for specific fuel consumption at TETs's is being developed.

Computers are being ever more widely used in the power system to evaluate the activity of collectives in the area of fuel consumption. A number of programs for fuel monitoring, accounting and norm-setting are being used. A very useful program is one which evalutes fuel overconsumption due to reductions by the central dispatcher administration of turbine-extraction

thermal loads in order to regulate the electrical load. This program was developed and implemented by the services and the information-computer center of Mosenergo just before the past fall-winter load peak.

It thus became possible daily to evaluate the overconsumption of fuel due to: 1) nighttime turbine load reductions below the technological minimum for district-heating needs and 2) load reductions from extractions during heat-load maximums to cover electrical load peaks with electricity from district-heating turbines. Under these operating conditions, the peak-load hot-water boilers are fired to cover the heat loads, which leads to a large overconsumption of fuel. For instance, from 1 January through 27 March of this year, Moscow TETs's overconsumed over 22,000 tons of standard fuel. Such a expedient technology, in our opinion, is absolutely unjustified.

It should be noted that the technological operating conditions become less efficient from year to year. Therefore, there must be greater attention to finding internal reserves, so that all engineers, technicians, workers and office workers will strive for higher work efficiency.

In the effort to improve its management activity, Mosenergo is giving constant attention to fuel cost. An analysis of the fuel component of the generating cost showed that claims work involving incoming inspection of fuel quality and quantity has a strong influence on the fuel cost.

The results of this work show the necessity of further improving the organization and conducting of fuel claims work:

Financial Relations with Fuel Suppliers	1980	1981	1982	1983	1984
Recovered for undershipments of fuel, thous. R	7130	892	735	716	737
Fuel price reduction obtained for low quality, thous. R	4952	4685	18295	16416	11866

The price reductions for fuel quality increased sharply in 1982 because until 1981 only the quality of solid and liquid fuel was systematically monitored at the power system's electric power plants. In 1982, continuous automatic monitoring of the specific combustion heat of natural gas was implemented. As a result, the gas cost reductions for low specific combustion heat were 11.568 million R in 1982. The cost of 1000 cubic meters of natural gas was 27.2 R compared with the official price of 28 R. Despite the fact that on 1 January 1983 the State Committee on Prices introduced a new price list, No 04-03, according to which the specific calculated combustion heat is established at 100 kcal/cubic meter lower (8100±100 instead of 8200±100) at the same price of 28 R per 1000 cubic meters, the price reductions for low specific combustion heat were 9.1 million R in 1983 and 12.3 million R in 1984.

Quality control of gas fuel was also carried out in the Moscow Power System before 1980. However, it was not taken into account in the TEI's, since the dynamic reduction in specific fuel consumption ensured normal

financial-management activity, as well as the accumulation of necessary incentive funds. In 1981, when the fuel use situation sharply deteriorated due to changes in operating conditions, the power system did not fulfill its profits plan. Vigorous actions were needed to reduce expenditures. The main attention was given to the fuel component of the generating cost, specifically to the price of fuel.

During 1981-1982, model SK automatic calorimeters, manufactured by the Junkalor Company (GDR), were installed at all Mosenergo electric power plants. Because the specific combustion heat of the incoming gas was monitored, the cost of a ton of natural gas fuel began to drop from year to year: 1981, 28.00; 1982, 27.21; 1983, 27.41, and 1984, 27.29 R. The increase in 1983 over 1982 is explained by the introduction of the above-mentioned addendum to the price list.

The reduction in gas cost and the claims work for other types of fuel have created a stable trend of reduced fuel cost and smaller fuel component of the generating cost for the entire power system:

Fuel Component	1980	1981	1982	1983	1984
For electricity generation, thous. R	6.87	6.92	6.75	6.65	6.59
For heat generation, thous. R	42.53	42.86	42.32	42.39	42.23

In 1981, the fuel component for electricity generation and for heat production rose, due to the increase in the specific fuel consumption. In 1982, despite the fact that the specific fuel consumption continued to rise and was 0.7 g/kWh higher than in 1981, the fuel component was lower than in the previous year.

The series of efforts to improve fuel use in the power system brought results, and since 1982, the power association has annually achieved good indicators.

One of the directions for further work will be the use and improvement of the system of economic education for the power system's engineers, technicians, workers and office workers. This education will be specifically linked with the economics of the electric power plants, heating systems and plants of Mosenergo.

In order to improve the management mechanism in the power industry, changes will be introduced beginning in 1986 in the existing system of plan and fund-formation indicators of the sector. In particular, the indicator of specific fuel consumption is being used as a calculation indicator.

Incentives for personnel will be instituted for absolute savings of fuel compared with normative specific fuel consumptions (according to normative characteristics).

The new system of incentives for fuel conservation presages a further improvement in fuel use, although the transition to the new mechanism will require a lot of work.

Mosenergo has many years of experience in using computers to calculate the normative specific fuel consumption. Today, mathematical models have been developed for all electric power plants. The computer center can practically daily calculate the cumulative normative specific fuel consumption in accordance with the normative characteristics of the units.

Once every 10 days, electric power plants determine the actual specific fuel consumption, so that there is a printout for every 10-day period reflecting the actual and normative specific fuel consumption. An analysis of the data shows that of 17 TES's, only 2 are operating with normative indicators; the other TES's have indicators which are from 0.5 to 12 g/kWh below the norm. There are a number of objective reasons for these poor indicators.

We feel that this objective principle must be determined and that a justified lowering of the fuel-use indicators must be introduced into the normative characteristics. This will permit the organization from the very beginning of a targeted, consistent effort to improve absolute fuel savings. Mosenergo is prepared to share its experience in improving the entire mechanism of fuel accounting and fuel-conservation monitoring.

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